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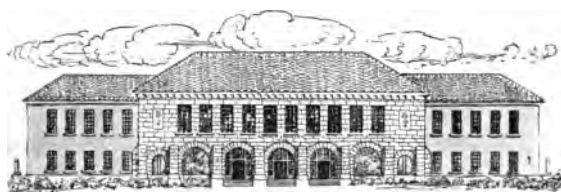
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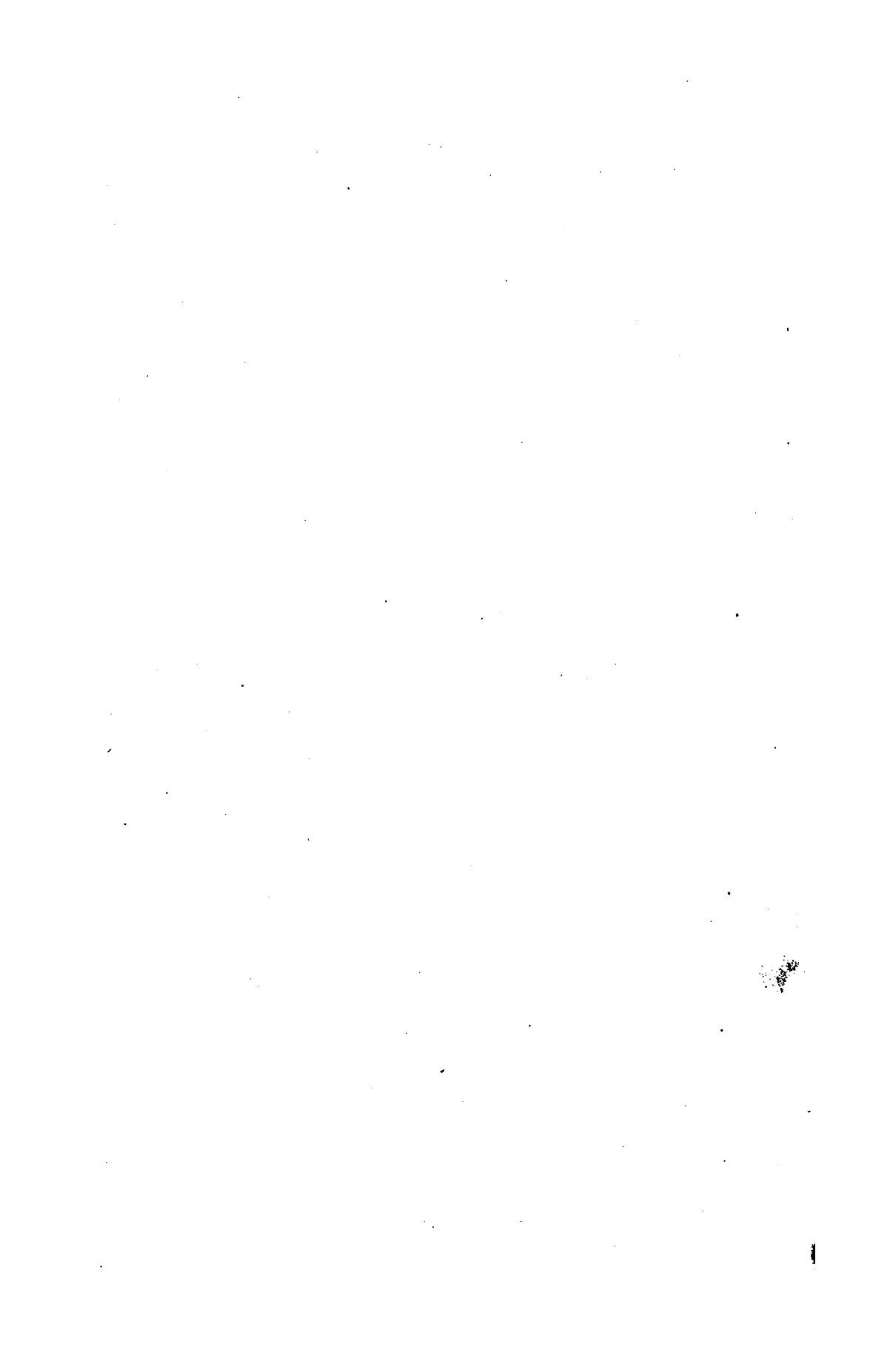
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PROCEEDINGS  
OF THE  
FOURTH ANNIVERSARY  
OF THE  
UNIVERSITY CONVOCATION

OF THE  
STATE OF NEW YORK,

Held August 6th, 7th and 8th, 1867.

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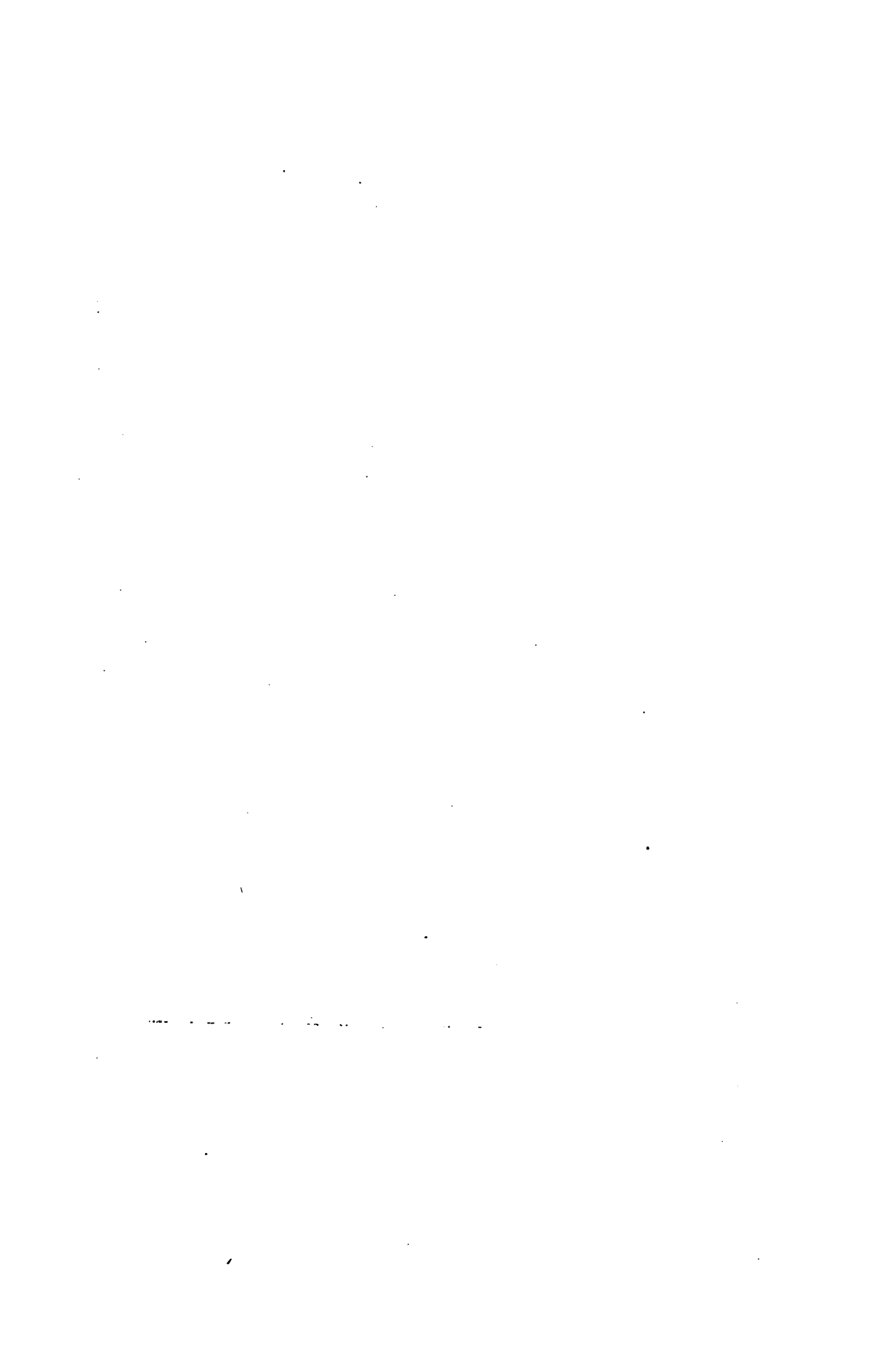


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## THE UNIVERSITY CONVOCATION OF THE STATE OF NEW YORK.

MINUTES OF THE FOURTH ANNIVERSARY, AUGUST 6, 7 AND 8, 1867.

The sessions of the Fourth Anniversary of the University Convocation of the State of New York were held at the lecture room of the State Agricultural Society, in the city of Albany (the Assembly chamber of the Capitol being occupied by the Constitutional Convention), commencing on Tuesday, August 6th, 1867, at ten and one-half o'clock A. M., and closing on Thursday, August 8th, at twelve o'clock M.

The Convocation was called to order by Chancellor Pruyn, President *ex-officio*.

Rev. Regent Luckey led the Convocation in the use of the Lord's Prayer.

The Chancellor addressed the Convocation as follows :

GENTLEMEN: We meet under circumstances of much interest. The cause of education during the past year has made large advances, not only in our own State, but also in every part of the country. Notwithstanding the depressed condition of the Southern States, many of their institutions of learning have been reopened, and commendable efforts have been made in various directions in elevating education. In other parts of the Union, much has been done to strengthen the colleges and academies, and the liberal additions made to the already large endowments of Harvard and Yale, show the high regard entertained for these old and honored institutions.

In our own State, in addition to the liberal aid extended to many of our institutions of education by individuals and by local authorities, provision has been made for founding four additional Normal Schools—one at Fredonia, one at Brockport, one at Cortlandville and one at Potsdam. At each of these places, about seventy thousand dollars have been contributed by the citizens or local authorities in aid of the projected institutions.

By an act of the last Legislature, the common schools of the State have been made free, and the means of education are thus placed within the reach of all without money and without price.

The Convention for revising the Constitution of our State is now holding its sessions in this city. Among its standing committees is one on "Education," of which Mr. Curtis, a member of the Board of Regents, is chairman, and Mr. Clinton, another member of the Board, is also one of its number. What this committee intend to recommend in regard to educational matters, I am not informed, and, indeed, I believe that as yet they have not reached any conclusion. They will, I presume, confine their action chiefly to the establishment of important principles and of proper safeguards, leaving it to the Legislature to provide details.

There is much work before the Convocation, and I feel that I must be brief. On behalf of the Regents of the University, I welcome you very cordially on this occasion, and hope that the proceedings of the Convocation will be of permanent benefit to the cause we have at heart—that of the education of the people.

The Executive Committee appointed by the Chancellor at the last Convocation and having in charge the general preliminary arrangements, consists of Professor Upson, of Hamilton College; Professor Perkins, of Union College; Professor French, late of the State Normal School; Principals Clark, of Canandaigua Academy; Crittenden, of Packer Collegiate Institute; Wells, of Peekskill Academy; and Steele, of Elmira Academy.

Professor Upson, in behalf of the Executive Committee, reported the following order of exercises, and recommended its adoption:

#### ORDER OF EXERCISES.

Sessions (except the first), 9 A. M. to 1 P. M.; 3 $\frac{1}{4}$  to 5 $\frac{1}{4}$  P. M.; 8 P. M.

Joint Sessions, morning and evening; Sectional Sessions, each afternoon.

#### *Tuesday, August 6.*

10 $\frac{1}{2}$  A. M. Opening of the Convocation, Preliminary Report of the Executive Committee and Miscellaneous Business.

11 $\frac{1}{2}$  A. M. The Nature and Method of teaching Mathematics, by Professor WM. D. WILSON, of *Hobart College*.

12 $\frac{1}{2}$  P. M. The Modern Languages, by Professor ADOLPH WERNER, of the *College of the City of New York*.

1 P. M. *Recess.*

3 $\frac{1}{2}$  P. M. What further action is desirable in relation to the Decimal System of Weights and Measures? by Professor J. B. THOMSON, of *New York*.

*College Section.*

- 4 P. M. "Report on the advisableness of having the entrance examination to college conducted in whole or in part by a special board of Examiners to be appointed by the Regents," by President JOHN W. LINDSAY, of *Genesee College*, Chairman of Committee.

*Academy Section.*

- 3½ P. M. Report on "A Suitable course of study and appropriate testimonials for females in the higher institutions of the State," by Regent ERASTUS C. BENEDICT, Chairman of Committee.
- 5 P. M. A Uniform Course of Study for Academies, by Professor CHARLES S. HALSEY, of *Canandaigua Academy*.

5 ½ P. M. *Recess.*

- 8 P. M. Hon. HENRY BARNARD, U. S. Commissioner of Education, is expected to address the Convocation.

The report of the committee was accepted and adopted as the order of business for the day,

Secretary Woolworth moved the appointment, by the Chair, of a special committee to prepare a suitable memorial of several recent members of the Convocation, whose decease has occurred during the past year. The motion was unanimously adopted.

Acting President William D. Wilson, of Hobart College, read a paper on "The Nature and Method of Teaching Mathematics" (Vice-Chancellor Verplanck in the chair.) By request, the "differential equation of free will" alluded to in the paper, was subsequently placed upon the blackboard.

Regent Wetmore suggested the importance of utilizing, as far as possible, the subject matter of the papers read, by oral discussions, and the consequent need of regarding the usual limit of time assigned to written papers, which, on some previous occasions, has been disregarded.

The subject of the paper was discussed by Principals Clark, of Canandaigua Academy; Snook, of Monticello Academy; Wilson, of Newark Union Free School; Professors Perkins, of Union College; J. B. Thomson, of New York City, and Haytt, of Rutgers Female College.

At the assigned place in the order of exercises, Professor Adolph Werner, of the College of the City of New York, addressed the Convocation on the subject of "The Modern Languages."

This subject was further discussed by Rev. Regent Luckey; Principal Wilson; Professor Hyatt; Principal Whipple, of Lansingburgh Academy; and Vice-Chancellor Verplanck.

The Convocation then took a recess until 3½ P. M.

*Afternoon Session—3½ o'clock.*

The Convocation was called to order by the Vice-Chancellor.

Regent Wetmore offered the following resolution, which was adopted by rising:

IN CONVOCATION of the Trustees and Faculties of the Colleges and Academies of the State of New York.

ALBANY, August 6, 1867.

*Resolved*, That the members in attendance on the State Constitutional Convention, now in session at this city, be respectfully invited to attend and take part in the proceedings of this Convocation, held under the invitation of the Regents of the University of the State of New York.

*Resolved*, That the preceding resolution, authenticated by the officers of the Convocation, be presented to the President of the State Constitutional Convention.

The following report of the special committee appointed by the Chancellor at the last Convocation, in pursuance of a resolution adopted by the Convocation of 1865, on "A suitable course of study and appropriate testimonials for females in the higher institutions of the State," was read, in behalf of the committee by Principal J. C. Gallup, of the Female Department of the Clinton Grammar School (Houghton Seminary) as follows:

The committee appointed upon the subject of a suitable course of study and appropriate testimonials for females in the higher institutions of the State, would respectfully submit the following as the result of their deliberations:

While comparatively slight diversity of sentiment prevails among educators upon what is deemed a full course of study for young men, or the gradating steps by which it is to be attained, there seems to be a crude and as yet unsettled state of opinion upon the whole question when applied to the training of young women; and yet no attentive observer of the progress of society can fail to see that this, and questions kindred to it, are rapidly forcing their way upon public attention.

We are not blind to the fact that there seems to be an increase in the number of those who would demolish all distinctions, political, educational and social between the sexes, ignoring alike the providence of God and the common sense of mankind. These would throw open the doors of our colleges, medical and law schools to women, and have their various classes filled indiscriminately with students of both sexes. The furtherance of these views your committee do not understand to be any part of their duty, but rather to present to the Convocation a system or course of study upon which, if possible, all the institutions of a higher grade engaged exclusively in the education of young women can be induced to unite, appropriating to each year of the course its own especial branches of study, in order that a young lady passing from one institution to another may find herself still in the same class or stage of progress in which she would have been had she remained in the school originally entered: whereas, in the present chaotic state of things there seems to be no uniformity whatever in this particular. This object once attained, there will be but little difficulty in determining what and how much a diploma or degree conferred by an institution of this character represents.

Your committee find this task at once delicate, complicated and difficult of attainment, because, chiefly, of the numerous adjuncts, to what for the other sex is called a complete course of study, which are necessary in female culture. And yet, while these cannot be ignored, the degree of attention devoted to them, must, to a large extent, be determined by the means, taste, capacity and purposes of individual students. We base our report upon the position that the sphere of woman does not cover or embrace the entire field of human activities and obligations, but that her mental organization, her tastes and her destiny are peculiar to herself, and that she therefore requires a curriculum of study adapted to these peculiarities.

Upon examining and comparing the courses adopted by the Troy, Vassar, Elmira, Houghton, Canandaigua and Ingham institutions, we find not only a wide diversity of sentiment indicated as to what studies shall be considered as best adapted to the different years and terms, but we also find that some of these embrace nearly twice as much as others in the course marked out. Your committee are of the opinion that danger arises from an attempt to crowd too much mental labor into a given space of time, thereby sacrificing thoroughness to variety. We believe that the necessity now pressing most seriously upon the class of institutions under consideration is that of thoroughness and uniformity. We find that while about one thousand students annually resort to the above named institutions, less than two score complete the prescribed course and graduate from them; the result of which is an extreme difficulty in finding ladies satisfactorily qualified for



the position of preceptress of an academy or instructor in the higher grade of female seminaries. Multitudes know something of mathematics, natural sciences, French and *belle-lettres*, and imagine themselves, and are recommended by their friends, to be qualified to instruct in these branches, who, upon trial, prove utterly deficient. We believe that while one and perhaps the chief cause of this state of things is to be found in the want of a more correct and well defined public sentiment upon this subject, not a little responsibility rests with the institutions themselves.

They would therefore recommend the adoption of the following curriculum by all the female seminaries of a higher grade in the State, it being assumed that a thorough knowledge has been attained of elementary branches, including Reading, Spelling, Writing, Arithmetic, Grammar, Geography, U. S. History, Latin Grammar and Reader, Cæsar, or an equivalent, and Elementary Algebra, before entering; these branches to be taken up in the order in which they are named in this report :

*First Year.*

University Algebra, Gramatical Analysis, Sallust, Ancient History, Physical Geography, Physiology and Hygiene, Virgil, Modern History, Bible and Exercises in Composition, with Elocution throughout the year.

*Second Year.*

Geometry, Virgil, Natural Philosophy, Chemistry, Trigonometry, Rhetoric, Cicero, Botany, Bible and Exercises in Composition throughout the year.

*Third Year.*

German History, Livy, Evidences of Christianity, Political Economy or Science of Government, Mathematical Astronomy, Selected Odes and Satires of Horace, Geology, English and American Literature, Bible and Composition throughout the year.

*Fourth Year.*

Natural Theology, Moral Science, Elements of Criticism, Critical Reading of Standard Poets, Philosophy of History, Mental Philosophy, Logic, History of Literature, Butler's Analogy, Bible and Essays throughout the year.

In the foregoing it will be at once seen that neither the Modern Languages nor the arts of Painting and Music are incorporated. It not, however, understood that these are to be ignored as non-essentials. On the contrary, they are deemed of great importance, and should be freely distributed throughout the course; and if

this is judiciously done, instead of proving a hindrance to progress in other branches, they may be relied upon as most valuable aids, by unbending the mind and serving as recreations. And in many cases it may be thought expedient to require less of Latin, and substitute for it the French, German and Italian languages. Physiology is placed early in the course, because, first, it is believed that young ladies cannot too soon become familiar with their physical structure and the laws of health; and second, because many may not prosecute the full course, and it is desirable that all shall possess a knowledge so essential to their future welfare.

It will also be observed that we recommend the study of the Bible throughout the entire course. This is done inasmuch as we believe a knowledge of the Scriptures an essential part of the education of every woman. Not that we would have women theologians in a sectarian or controversial sense, but that in her family, in the Sabbath school, and in all her intercourse with the young she may be able to exert that moral influence for which, in the Providence of God, she is so eminently designed.

The committee recommend that a course of study such as is here presented be adopted by the Regents, with such modifications as to them may seem necessary, as the collegiate course for young women; and that all academies which shall adopt and pursue such course in good faith be known as the Regents' Academies for Young Women; and that the graduates of such academies who, on public final examination, shall be certified to have satisfactorily completed such course, shall be entitled to receive a diploma as Regents' Graduates in Art; and that a uniform certificate be prepared by the Regents for all such seminaries, and be signed by the proper academic authorities of such academies respectively, and by the Chancellor and Secretary of the Regents, it being understood that the Regents shall be notified of the time and place of such final examination, and shall have the right to be represented at the same by a committee of the Regents.

(Signed)

ERASTUS C. BENEDICT, *Chairman.*

Regent Benedict, as chairman of the committee submitting the report, made some statements in exposition of the views therein presented, and alluded to a very valuable letter on the same subject which had been received by a member of the committee from Miss M. E. Thalheimer, of Packer Collegiate Institute, and which he regarded as worthy of publication.

On motion of Principal Graves, of Oneida Conference Seminary, it was directed that a copy of this letter be solicited for publication in connection with the proceedings of this Convocation.

The subject-matter of the report was further discussed by Secretary Woolworth; President Hickok, of Union College; Principal

Graves, of Oneida Conference Seminary; Chancellor Ferris, of the University of the City of New York; and President Raymond, of Vassar College.

On motion of Mr. Regent Wetmore, it was unanimously

*Resolved*, That the report of the committee be accepted, the committee discharged, the report printed, and the further consideration postponed until the next Convocation.

Secretary Woolworth stated that the chairman of the special committee appointed by the last Convocation to report on this subject (Professor Davies) being unable to be present on this occasion, Professor J. B. Thomson, of New York, has consented to read a paper on the same subject.

Professor J. B. Thomson then read a paper on "The Decimal System of Weights and Measures."

After the reading of Professor Thomson's paper, Secretary Woolworth submitted the following resolution:

*Resolved*, That this Convocation, in view of the advantages of the *metric system* of weights and measures, recommend its introduction as a branch of study in all our public schools and academies at the earliest day practicable.

Discussion ensued, in which the following persons took part: Regent Perkins, Professor Perkins, of Union College; Principal McVicar, of the Brockport Normal School; Principal Clarke, of Canandaigua Academy; and Professor Murray, of Rutgers (N. J.) College.

The pending resolution was then adopted, and the Convocation took a recess until 8 o'clock P. M.

#### *Evening Session—8 o'clock.*

In the absence of Hon. Henry Barnard, U. S. Commissioner of Education, who had been expected to address the Convocation at this time, Professor Benjamin N. Martin, of the University of the City of New York, read a paper entitled "The Classics in Education."

The views of the paper having been very earnestly commended by Regents Wetmore and Benedict, Professor Perkins, of Union College, and Secretary Woolworth, on motion of Regent Wetmore, it was unanimously

*Resolved*, That the thanks of the Convocation are eminently due to Professor Martin for this delightful paper, and that he be requested to furnish a copy for immediate publication in separate form, to be distributed to the various institutions subject to the visitation of the Regents.

The Chancellor announced the order of exercises for the second day (Wednesday), as proposed by the Executive Committee.

The Convocation then adjourned to Wednesday morning at 9 o'clock.

## SECOND DAY.

### *Morning Session—9 o'clock.*

The Convocation assembled at 9 o'clock A. M., Regent Wetmore in the Chair.

The usual devotional exercises were led by Rev. Chancellor Ferris, of the University of the City of New York.

Professor Upson, in behalf of the Executive Committee, reported the following order of exercises for the day, which was adopted :

### ORDER OF EXERCISES.

#### *Wednesday, August 7.*

9 A. M. Opening of the Convocation, Preliminary Report of the Executive Committee, and Miscellaneous Business.

9½ A. M. The Study of Philosophy, by Professor LOUIS JOURN, of *St. John's College*.

10½ A. M. Report on "Voluntary Endowments of Academies," by Chancellor PRUYN.

#### *College Section.*

11½ A. M. "Report on the advisableness of having the entrance examination to college conducted in whole or in part by a special board of Examiners to be appointed by the Regents," by President JOHN W. LINDSAY, of *Genesee College*, Chairman of Committee.

#### *Academy Section.*

11½ A. M. A Uniform Course of Study for Academies, by Professor CHARLES S. HALSEY, of *Canandaigua Academy*.

12½ P. M. The desirableness of greater uniformity in the arrangement of Academic terms and vacations. (Discussion.)

1 P. M.

#### *Recess.*

3½ P. M. The Study of Mathematics, by Professor GERARDUS B. DOCHARTY, of the *College of the City of New York*.

4½ P. M. Educational Economy, by Professor DAVID MURRAY, of *Rutgers College, N. J.*

5 P. M. Literary Exercises in Academies, by Principal SAMUEL J. LOVE, of *Jamestown Academy.*

5½ P. M. *Recess.*

8 P. M. HON. HENRY BARNARD, U. S. Commissioner of Education, is expected to address the Convocation.

The Chancellor invited the Convocation to meet the members of the Constitutional Convention at his residence after the close of the evening session.

Professor Louis Jouin, of St. John's College, read a paper entitled "The Study of Philosophy."

The subject of the paper was discussed until the time for the next order of business by Professor Martin, Regents Wetmore and Benedict, and Principal Whipple.

A report in part on "Voluntary Endowments of Academies," prepared at the request of the Executive Committee, was presented by the Chancellor.

Secretary Woolworth, Chancellor Ferris (by request of the chair), Rev. Regent Luckey, Superintendent Rice and Professor Upson severally took part in the discussion of the subject of the Chancellor's paper.

Regent Benedict offered the following resolution:

*Resolved*, That the University Convocation respectfully recommend to the Convention now in session and to the State Legislature to adopt some safe system by which the State will accept, as trustee, donations which may be made for the benefit of public education in particular educational institutions, the State to retain the fund and pay the income thereof according to the terms of the trust, forever.

The mover spoke in favor of the resolution and of "monumental benefactions."

The resolution was unanimously adopted, and ordered to be transmitted to the Convention and to the Legislature.

The following order was also taken on motion of Regent Wetmore:

1st. That the report be accepted as a report in part.

2d. That it be recommitted.

3d. That so much of the report as the Chancellor may deem proper be published as a part of the proceedings.

4th. That the Regents be requested to continue the same committee in charge of this subject.

*College Section—11½ o'clock.*

The College Section convened in an apartment of the State Normal School building, Rev. Regent Goodwin in the chair.

President John W. Lindsay, of Genesee College, in behalf of a special committee appointed in pursuance of a resolution of the last Convocation, to consider "the advisability of having the entrance examination to college conducted either in whole or in part by a special board of examiners to be appointed by the Regents," read a report on this subject, which was discussed at length by Chancellor Ferris, Professor Upson, President Raymond, Professor Murray, Warden Fairbairn, Principal Mason (by invitation), Professor M. Perkins and President Lindsay.

On motion of Chancellor Ferris, the report was recommitted to the same committee.

The College Section then adjourned to meet to morrow (Thursday) at 10 o'clock A. M.

*Academy Section—11½ o'clock.*

Professor C. S. Halsey, of Canandaigua Academy, read a paper entitled "A Course of Study for Academies (Rev. Regent Luckey in the chair.)"

The subject of this paper was discussed by Principal Benedict, of Rochester Free Academy; Professor Lambert, of New York; Principals Clarke, of Canandaigua Academy; Williams, of Ithaca Academy; and Vice-Chancellor Verplanck.

Secretary Woolworth stated the desirableness of greater uniformity in the arrangement of academic terms and vacations.

After some discussion of this subject, on which no formal action was taken, the Academy Section adjourned, to meet at such time as the Executive Committee may appoint.

The Convocation then took a recess until 3 o'clock P. M.

*Afternoon Session—3 o'clock.*

Professor Gerardus B. Docharty, of the College of the City of New York, read a paper on "The Study of Mathematics" (Vice-Chancellor Verplanck in the chair.)

The subject of the paper was discussed by Principal White, of Sauquoit Academy; Professor Briggs, of Falley Seminary; and Regent Perkins.

Professor David Murray, of Rutgers College, N. J., read a paper on "Educational Economy."

The subject of this paper was discussed by Chancellor Pruyn, and Principal Wilson, of Newark Union School.

On motion of Secretary Woolworth, the thanks of the Convocation were unanimously tendered to Professor Murray for his very able and interesting paper.

The Chancellor announced as the Committee on University Necrology, in pursuance of a resolution of yesterday, Secretary Woolworth, Professor Perkins, of Union College, and Principal Mason, of Albany Academy. This committee was authorized to perfect the several biographical sketches in course of preparation, for publication as part of the proceedings of the Convocation.

Principal Samuel J. Love, of Jamestown Union School, read a paper on "Literary Exercises in Academies."

This subject was discussed by Principal Snook, of Monticello Academy; Superintendent Rice; President Raymond; and Professor Upson.

The Executive Committee reported the proposed order of exercises for the third day (Thursday.)

Secretary Woolworth announced the arrival of the Hon. Henry Barnard, U. S. Commissioner of Education, and the subject of his proposed address at the evening session.

The Convocation then took a recess until 8 o'clock P. M.

#### *Evening Session—8 o'clock.*

The chair (Regent Wetmore) announced that nineteen colleges of this State, three of other States, and sixty academies and high schools are represented in this Convocation by one hundred and twenty-five members of their respective Faculties.

The Hon. Henry Barnard, U. S. Commissioner of Education, was then introduced by the chair, with an allusion to the fact that he was formerly a pupil of Secretary Woolworth, who is equally honored by having educated such men, and by their grateful acknowledgment of heart-felt obligation.

Mr. Barnard addressed the Convocation at length in regard to the origin, plan and objects of the National Department of Education recently organized under the act of March 2, 1867.

On motion of Regent Benedict, the following resolution was unanimously adopted:

*Resolved*, That the members of the University Convocation of the State of New York hail with great satisfaction the provision recently made by Congress for the promotion of public education and the appointment of the present Commissioner of Education ; and they hereby tender to the Hon. Henry Barnard, the said Commissioner, their cordial coöperation and aid in the performance of the duties of his office in the manner most in accordance with his desires and experience.

At the suggestion of the chair, it was

*Resolved*, That a committee of three be appointed to confer and coöperate with Mr. Barnard for the promotion of the interests of education.

The Chancellor, the Superintendent of Public Instruction and the Secretary of the Board of Regents, were appointed such committee.

The Convocation then adjourned to Thursday morning at 9 o'clock, and the members, according to invitation, repaired to the residence of Chancellor Pruyn.

### THIRD DAY.

#### *Morning Session—9 o'clock.*

The Convocation met at the appointed hour, Regent Wetmore in the chair.

The usual devotional exercises were led by Rev. Regent Goodwin.

The following order of exercises for this final session was reported by the Executive Committee and adopted.

#### ORDER OF EXERCISES.

##### *Thursday, August 8.*

- 9 A. M. Opening of the Convocation and Miscellaneous Business.
- 9½ A. M. The Study of Latin, without reference to proposed liberal or professional education, by Principal N. W. BENEDICT, of *Rochester Free Academy*.
- 10 A. M. The Great Pyramid, by Professor DARWIN G. EATON, of *Brooklyn*.

##### 10½ A. M. *College Section.*

The relative time devoted to the various branches of the college course in the several colleges of this State, and in certain colleges of other States, by Assistant Secretary DANIEL J. PRATT, *Albany*.



Co-operation of Colleges of other States. (Discussion.)

Honorary Degrees. (Discussion.)

"The Military Roll of Honor" for the colleges. (Discussion.)

10 $\frac{1}{2}$  A. M.

*Academy Section.*

The Regents' Examination. (Discussion.)

Normal Instruction in Academies, by Principal NOAH T. CLARKE,  
of *Canandaigua Academy*.

A Paper on Reading, by Principal ALDEN B. WHIPPLE, of *Lansingburgh Academy*.

12 M.

*Joint Session.*

Miscellaneous Business and Adjournment *sine die*.

Secretary Woolworth stated that applications have frequently been made at the office of the Regents for information in regard to the employment of teachers in academies, and that it has seemed advisable to open a register for such applications, with a view of placing trustees and teachers in communication with each other, as vacancies occur.

On motion of Regent Benedict, it was

*Resolved*, That this Convocation recommend that the Regents open a register for applications from trustees who wish to employ teachers and from teachers desiring situations; and that means be employed to place such parties in correspondence, it being understood that the Regents assume no further responsibility.

Principal N. W. Benedict, of the Rochester Free Academy, read a paper entitled "The Study of Latin, without reference to proposed Liberal or Professional Education."

Vice-Chancellor Verplanck made a few remarks upon the subject of the paper of Mr. Benedict, and spoke of the desirableness of greater uniformity than now prevails in regard to the pronunciation of the Latin language, recommending this as a topic for future consideration. He also moved a vote of thanks to Mr. Benedict for his able, interesting and useful paper, which was unanimously adopted.

On motion of Secretary Woolworth, Vice-Chancellor Verplanck was unanimously requested to prepare a paper on Latin Pronunciation, to be presented at the next Convocation.

The Chancellor made a statement in regard to the paper of Professor Thomson on the Metric System, which had been read as a

substitute for the report of the committee appointed at the last Convocation, and moved that the same committee be continued, which was agreed to.

Professor Darwin G. Eaton, of the Packer Collegiate Institute, read a paper on "The Great Pyramid," and illustrated the subject by diagrams.

On motion of Regent Wetmore, it was

*Resolved*, First, that a vote of thanks be tendered to Professor Eaton for the delightful manner in which he has presented this abstruse subject; second, that he be requested to furnish the paper and diagrams for publication; and third, that the same subject be recommitted to Professor Eaton for further elaboration and presentation at the next anniversary of the Convocation.

Professor Martin expressed his approval of the vote of thanks, but questioned the correctness of some of the views of the paper, and thought the Convocation should not commit itself as endorsing them.

The Chancellor announced the Executive Committee for the ensuing year, as follows: Presidents J. W. Lindsay, of Genesee College; W. D. Wilson, of Hobart College; and J. H. Raymond, of Vassar College; Principals J. C. Gallup, of Clinton Grammar School; W. Higley, of Auburn Academic High School; and A. B. Whipple, of Lansingburgh Academy; and Professor D. G. Eaton, of Packer Collegiate Institute.

On motion of Regent Goodwin, it was

*Resolved*, That a committee of seven be appointed by the Chancellor (of which the Chancellor shall be the chairman), to confer with the Committee on Education in the Constitutional Convention, relative to the interests of higher education in this State.

The committee was constituted as follows:

Messrs. Chancellor Pruyn; Regent Goodwin; Superintendent Rice; Chancellor Ferris, of the University of the City of New York; President White, of the Cornell University; Professor Upson, of Hamilton College; and Principal Clarke, of Canandaigua Academy.

The Convocation then resolved itself into College and Academy Sections.

*College Section—11 o'clock.*

The College Section entered upon the order of business, Regent Wetmore in the chair.

Assistant Secretary D. J. Pratt, in pursuance of a resolution of the last Convocation, submitted a report in part on "The relative

time devoted to the various branches of the college course in the several colleges of this State and in certain colleges of other States," and asked additional time to perfect the same, which was granted.

A committee was also appointed, consisting of Professors Martin and Upson, and Commissioner Barnard, to confer with the Assistant Secretary in regard to this subject.

Under the head of "Co-operation of Colleges of other States," Assistant Secretary Pratt stated what had been done to carry out a resolution on the subject adopted by the College Section at the last Convocation.

On motion of Professor Martin, it was

*Resolved*, That the Regents be requested to invite the attendance of representatives of colleges of other States at future anniversaries of the Convocation.

A discussion on the subject of "Honorary Degrees" being next in order, the importance of a reform in the mode of conferring such degrees was urged by the following persons, who were also appointed a committee to prepare a report on this subject for the next Convocation: President White, of the Cornell University; Professor Martin, of the University of the city of New York; Professor Gallup, of Madison University; Professor Upson, of Hamilton College; President Wilson, of Hobart College; and Warden Fairbairn, of St. Stephen's College.

The subject of "The Military Roll of Honor of the several Colleges of the State," which was referred, at the last Convocation, to the presidents of the colleges, was taken up, and after remarks by the Chair and others, Professors Upson and Martin, and Assistant Secretary Pratt, were appointed a special committee of correspondence to confer with the college presidents on this subject.

After remarks by the Chair, expressive of his high appreciation of the interest and utility of these deliberations, this College Section adjourned *sine die*.

*Academy Section—11 o'clock.*

The Academy Section proceeded to consider the subjects assigned in the order of exercises (Regent Perkins in the chair).

The discussion on the "Regents' Examination," was opened by Secretary Woolworth, and continued by Principals Hamilton, of Oswego; Benedict, of Rochester; Clark, of Canandaigua; Merrill, of Watertown; Steele, of Elmira; Dann, of Warsaw; More-

house, of Albion ; Flack, of Claverack ; Graves, of Cazenovia ; Pease, of Gilbertsville ; Mason, of Albany ; and Professor Briggs, of Falley Seminary.

Without taking any formal action, the Academy Section adjourned *sine die*.

*Joint Session—12 o'clock, M.*

Secretary Woolworth expressed his high gratification at the character of the papers and proceedings of this anniversary of the Convocation.

Superintendent Rice invited all the members of the Convocation to attend, as some of them are accustomed to do, the future anniversaries of the State Teachers' Association.

The papers assigned to the Academy Section of this morning, and which were not read for want of time, viz : that of Principal Noah T. Clarke, of Canandaigua Academy, on "Normal Instruction in Academies," and that of Principal Alden B. Whipple, of Lansingburgh Academy, on "Reading," were directed to be published as part of the Convocation proceedings.

The appointed hour of adjournment having arrived, the Chancellor briefly addressed the Convocation, and declared the same adjourned to meet on the first Tuesday of August, 1868.

REGISTERED MEMBERS OF THE CONVOCATION OF 1867.

*Board of Regents.*

John V. L. Pruyn, LL.D., Chancellor ; Gulian C. Verplanck, LL.D., Vice-Chancellor ; Victor M. Rice, Superintendent of Public Instruction ; Prosper M. Wetmore, New York city ; Samuel Luckey, D.D., Rochester ; Erastus C. Benedict, LL.D., New York city ; George W. Clinton, LL.D., Buffalo ; Isaac Parks, D.D., Whitehall ; George R. Perkins, LL. D., Utica ; William H. Goodwin, D.D., Clifton Springs ; Samuel B. Woolworth, LL.D., Secretary ; Daniel J. Pratt, Assistant Secretary.

*Colleges.*

Union College—President Laurens P. Hickok, LL.D. ; Professor Maurice Perkins ; Professor William Wells.

Hamilton College—Professor Edward North ; Professor Anson J. Upson ; Professor Christian H. F. Peters, Ph. D.

Hobart College—Acting President William D. Wilson, D.D.

University of the City of New York—Chancellor Isaac Ferris, LL.D. ; Professor Benjamin N. Martin, S. T. D.

Madison University—Professor Ezra S. Gallup.

St. John's College—Professor Louis Jouin.

Genesee College—President John W. Lindsay, D.D.; Professor Wesley P. Codington.

University of Rochester—Professor Otis H. Robinson.

St. Lawrence University—Principal J. S. Lee.

Alfred University—President Jonathan Allen.

Ingham University—Professor William L. Parsons, D.D.

St. Stephen's College—Warden Rob't B. Fairbairn, D.D.; Tutor Arthur C. Kimber.

College of St. Francis Xavier—Professor Patrick F. Dealy.

Vassar College—President John H. Raymond, LL.D.

Cornell University—President Andrew D. White, LL.D.

College of the City of New York—Professor Gerardus B. Docharty, LL.D. ; Professor Adolph Werner ; Tutor Joseph H. Palmer ; Tutor Alfred G. Compton ; Trustee Richard L. Larremore.

Rutgers Female College—Professor James Hyatt.

Albany Medical College—Professor James H. Armsby ; Professor Jacob S. Mosher.

Long Island College Hospital—Professor Darwin G. Eaton.

State Normal School—President Joseph Alden, D.D.

Brockport Normal School—President Malcolm McVicar ; Professor Oliver Arey ; Professor James H. Hoose.

Rutgers College, N. J.—Professor David Murray.

University of Missouri—Professor Oren Root, Jr.

Iowa State University—President N. R. Leonard.

#### *New York State Teachers' Association.*

Ex-President J. B. Thomson, LL.D., New York city ; Corresponding Secretary James Cruikshank, LL.D. ; T. S. Lambert, Peekskill.

#### *Department of Public Instruction.*

Deputy Superintendent Samuel D. Barr ; Professor Michael P. Cavert.

#### *National Department of Education.*

Commissioner Henry Barnard, LL.D.; Washington, D. C.

*Academies.*

- Albany Academy—Principal James Weir Mason.  
Albany Classical Institute—Ex-Principal Charles H. Anthony.  
Albany Public Schools—Commissioner William E. Whitbeck,  
1st District; Principal George H. Benjamin.  
Albion Academy—Principal O. Morehouse.  
Andes Collegiate Institute—Principal James M. Smeallie.  
Antwerp Liberal Literary Institute—Principal J. Winslow.  
Auburn Academic High School—Principal Warren Higley.  
Baldwinsville Academy—Ex-Principal L. H. Cheney.  
Bergen (N. J.) Heights Institute—Principal Amos M. Kellogg.  
Brooklyn Public School, No. 14—Principal Benjamin Edson.  
Canandaigua Academy—Principal Noah T. Clark ; Professor  
Charles S. Halsey.  
Cary Collegiate Seminary—Principal James R. Coe ; Assistant  
Charles W. Stickle.  
Claverack Academy and Hudson River Institute—Assistant  
Robert C. Flack.  
Clinton Grammar School, Male Department—Principal A. P.  
Kelsey.  
Clinton Grammar School, Female Department—Principals John  
C. Gallup and Mrs. M. H. Gallup.  
Coxsackie Academy—Principal Hugh R. Jolley.  
Delaware Literary Institute—Principal George W. Jones.  
Elmira Academy—Principal J. Dorman Steele.  
Elmwood Seminary (Glen's Falls)—Principal Charles W. Bowen.  
Falley Seminary—Assistant E. A. Briggs.  
Fort Edward Collegiate Institute—Acting Principal James M.  
King.  
Genesee Wesleyan Seminary—Principal S. R. Fuller, Assistants  
Henry L. Harter, T. B. Stowell.  
Genesee and Wyoming Seminary—Ex-Principal James L. Both-  
well.  
Gilbertsville Academy and Collegiate Institute—Principal Jas.  
J. Pease.  
Hungerford Collegiate Institute—Principal J. D. Houghton.  
Ithaca Academy—Principal Samuel G. Williams.  
Jamestown Union School and Collegiate Institute—Principa  
Samuel G. Love.  
Jonesville Academy—Principal T. H. Kimpton.  
Keeseville Academy—Ex-Principal C. R. Ballard.

Knoxville Academy—Principal George H. Quay.  
 Lansingburgh Academy—Principal Alden B. Whipple.  
 Lowville Academy—Trustee Franklin B. Hough.  
 Macedon Academy—Principal Gardner Fuller.  
 Manlius Academy—Principal H. T. Hickok.  
 Mechanicville Academy—Principal C. C. Wetsell.  
 Monticello Academy—Principal F. G. Snook.  
 Munro Collegiate Institute—Principal T. K. Wright.  
 Newark Union Free School—Principal Jacob Wilson.  
 New Paltz Academy—Principal Jared Hasbrouck.  
 Norwich Academy—Assistant H. G. Burlingame.  
 Oneida Conference Seminary—Principal A. S. Graves ; Assist-  
 ants H. T. Fisk ; D. M. Brumagim.  
 Oswego High School—Principal E. J. Hamilton.  
 Peekskill Military Academy—Principal Albert Wells.  
 Pulaski Academy—Principal N. B. Smith.  
 Rochester Collegiate Institute—Principal L. R. Satterlee.  
 Rochester Free Academy—Principal N. W. Benedict.  
 Rochester Grammar School—Principal E. V. De Graff.  
 Saratoga Springs Union School—Principal J. N. Crocker.  
 Sauquoit Academy—Principal Aaron White.  
 Schenectady Union School—Superintendent E. A. Charlton.  
 South Brooklyn Select Academy—Principal A. T. Baldwin.  
 Spencertown Academy—Principal Isaac Fowler ; Ex-Principal  
 John P. Lansing.  
 Troy Academy—Principal T. Newton Willson.  
 Troy High School—Principal M. H. Martin.  
 Troy Public Schools—Superintendent E. Danforth ; Ex-Princi-  
 pal Wm. N. Barringer (Newark, N. J.)  
 Unadilla Academy—Principal S. E. Smith.  
 Union Hall Academy—Principal D. O. Quinby.  
 Walworth Academy (Brooklyn)—Principal John J. Anderson.  
 Warsaw Union School—Principal Charles H. Dann.  
 Watertown High School—Principal M. M. Merrill ; Trustee  
 Milton H. Merwin.  
 Wellsville Union School—Principal O. A. Blakeslee.  
 West Winfield Academy—Principal D. P. Blackstone.

*Reporters.*

New York Times—M. W. Pasko. New York Tribune—William  
 H. Belden.

## THE STUDY OF MATHEMATICS.

BY GERARDUS B. DOCHARTY, LL.D.,

*Professor of Pure Mathematics, in the College of the City of New York.*

In this progressive age of young America, when children are raised to men and women without passing through the intermediate degrees of human life, it becomes a serious question to what extent, if any, shall that curriculum which time has consecrated, the wisdom of ages has sanctioned, and the experience of centuries has abundantly proved to be adequate to the task of educating the youth, be abridged, altered or modified to accommodate that restless, innovating spirit which now pervades the masses.

The mind of man, that immortal principle which, when thoroughly and liberally educated, makes him what he was intended to be—the lord of the earth—seldom educates itself. It needs early training. It requires constant and systematic discipline for many years, and the great problem is, of what nature shall that discipline be, in order to accomplish the object we are seeking: what studies shall the youth pursue, to what extent shall they be carried, and how much time shall be devoted to them, under the direction of competent instructors, before he is allowed to assume the rectorship of his own will and the control of his own actions?

Two systems are offered.

One (advocated with all the power of windy rhetoric by modern reformers,) in which the asperities of the route are smoothed down by skillful engineers, and the road macadamized so nicely that the student can travel it without fatigue, labor or difficulty of any kind. No slough of despond to wade through, no high hill to climb, no deep mine to delve in, no *pons asinorum* to pass over, can be found in this “royal road” to scholarship and fame. Along this delightful path the student has no abstruse mathematics to perplex him, no metaphysics to bewilder his mind, no ancient classics to mislead his judgment or deprave his taste with heathen ideas.

Such is the scheme of education which some philosophers are seeking to substitute in place of the old and well proved system



which was pursued by the ancients and which, since the restoration of letters, has been followed by the greatest masters of modern times.

The advocates of this new programme estimate an education solely and entirely in proportion to the amount of wealth which may accrue from its practical operation. With them every branch of study should be made to pay its own expenses. Say they: "Teach the rising generation practical science only; turn the old-fashioned, effete colleges upside down; abolish the Greek and Latin languages; the time spent in poring over these musty volumes is utterly lost! Away with the abstract mathematics; let the young men learn useful knowledge—such knowledge as they can take into the market and find a ready sale for."

These reformers have no idea that there is an intellectual pleasure in the *labor* which the study of an abstract branch of science evokes; that this labor is accompanied with enjoyments of the purest and highest kind; that it confers advantages upon the student which he can obtain in no other manner; that when employed in mathematics, it enlarges his faculties, increases the vigor and power of his mind, refines and elevates his desires, adorns and dignifies his whole character; that when laboring in the study of the exact sciences, the student's thoughts are withdrawn from everything that is mean or degrading, and turned to the noblest and worthiest of all objects—the veneration and practice of truth! The idea that these reformers have of intellectual labor is comprised entirely in that of cultivating the memory only. Be observant of everything that surrounds you and recollect it, is the essence of their system. This doctrine, however, does not belong exclusively to our own country. We learn from Mr. Dickens, that inimitable delineator of English character, that a certain Thomas Gradgrind of Stone Lodge held opinions very similar to those we have been describing; and, in fact, they may have been the germ from which this utilitarian idea has sprung. "What I want," said that eminent philosopher, "is facts; teach these boys and girls nothing but facts; facts alone are wanted in life. Plant nothing else, and root out everything else."

This Gradgrinding notion, in a modified form, extends more widely than the generality of instructors suppose. Some of the ablest editors of our daily papers are possessed of the idea, and are endeavoring to propagate it by means of the press. They are, no doubt, honest in their opinion. They have had constant inter-

course with men of all classes for several years, and have occasionally come in contact with individuals of strong minds and persevering energies; men, who by their own struggles have risen to to place and power without having attained a collegiate education; and judging by these—and forgetting how earnestly and laboriously they themselves had toiled in, their earlier days, to fit their minds for the battle of life,—have now come to the illogical conclusion, that a liberal education can be obtained by any person without that labor, thought and perseverance, which are so earnestly recommended by every faithful teacher. They little know of the many hours which these very men have spent in solitary and unaided study to make themselves what they have become. It is true that they were never matriculated in any college, and perhaps had but indifferent teaching, for a short time, in some rustic school-house, but the training which they subsequently imposed upon themselves must have been severe, and was, no doubt, the training best adapted to their minds.

But I must “on to my subject,” which is to give a few hints on the method of teaching and studying the mathematics; and to show the position which it holds in the old-fashioned course of studies—that course through which the foundation of a liberal education may safely be guaranteed.

The great pillars on which this superstructure rests are mathematics, intellectual philosophy and the ancient classics; while rhetoric, belles-lettres, history, natural science, the arts, logic and the principles of Christianity make up the beauty and grace which adorn and embellish the intellectual temple.

The term mathematics includes one of the most extensive as well as the most useful and labor-exacting departments which the human mind is called upon to study. That it is also one of the most difficult may, perhaps, be assumed as an axiom. And it is this very quality which gives it its pre-eminence in cultivating the intellectual powers. Labor is just as necessary for the healthful and vigorous growth of the faculties of the mind, as it is for that of the muscles of the body. We can no more dispense with it in the one case than we can in the other. But, that the science of mathematics is the most difficult of all branches is a proposition which can be demonstrated neither directly nor by *reductio ad absurdum*.

Every department undoubtedly has its difficult points and its abstruse passages; and in no branch of literature or science can distinction or eminence be arrived at without constant and persevering effort. But if there be one department which is distinguished more than any other by the simplicity and obviousness of its fundamental principles; by the irresistible evidence with which step after step in the demonstrations is taken; and the systematic progression by which stage after stage of the journey is completed, that subject is mathematics. In many other branches of education there is more or less of doubt or uncertainty. There are dark places into which the light of demonstration can never penetrate, and where we are compelled to theorize and conjecture; but in mathematics there are no such opaque passages and no uncertainties whatever. Here no *ignis fatuus* misleads the youth from the plain and beaten track; the road is clear and straight forward. His progress is continually under the unerring direction of truth, and it is the torch of truth which alone lights up the whole horizon. If the subject is difficult, the difficulty is not concealed but open before him, and all that is necessary to surmount it is patient thought and persevering application. Whatever, then, may be the troubles which the student in mathematics may have to encounter, he knows that they arise either from a want of skill in performing the analysis, or ability in interpreting the symbolical expressions with which he is engaged. It is exceedingly important, then, that the student be early taught to give every symbol and every equation its proper explanation. He will find but little difficulty in performing the elementary operations, for they are somewhat mechanical in their nature; but to interpret the results requires a knowledge of the subject on which he is engaged, and unless he can explain what he has done, he has not mastered it, and should proceed no further until that difficulty is surmounted.

Some appear to think that the only object of Algebra is to solve difficult problems, to obtain the roots of equations of the third and higher degrees, to discuss the Diophantine analysis, &c.; matters which of themselves, are of little value in the present state of scientific enquiry. They forget that Algebra is the most complete and comprehensive language in the world—a language which is universal—which is the key to the higher branches of science, and which will ultimately unfold the profoundest mysteries of nature. And consequently, regarding it in this inferior light, they

omit the better part of its character when they are training their pupils in this important branch of mathematics. To illustrate this assertion, I feel authorized to mention the following instance. It occurred in my recitation room, shortly after the Free Academy was founded. We had just commenced a new term, and a section of the introductory class was before me, charged to the muzzle with a lesson in Algebra. Among the number was a lad who could clear equations of fractions, transpose, reduce the similar terms and obtain the value of the unknown quantity, like any conjurer. Indeed, he had been considered the best scholar at the school from which he had passed to us; and from his deportment and self assurance, no doubt could exist that, in his own estimation, he knew as much of Algebra as his instructor did, if not a little more. I gave him the old problem, which happened to be in his lesson for that day:

"A cistern containing sixty gallons, can be filled by three pipes; the first can fill it in one hour, the second in two hours and the third in three hours. In what time will the cistern be filled when all the pipes are open at once?"

I had barely finished reading the problem when he had it solved on the blackboard. I examined his work which stood thus :

Let  $x$  = the time.

$$\text{Then } x + \frac{x}{2} + \frac{x}{3} = 60$$

$$6x + 3x + 2x = 360$$

$$11x = 360$$

$$\therefore x = 32\frac{8}{11}$$

The following conversation then took place between us :

"What does  $x$ , the first term in your equation represent?"

"The time!"

"What does  $x$  divided by two indicate?"

"Half the time!"

"And  $x$  divided by three, what does that mean?"

"One-third of the time!"

"Where do you get the sixty?"

"That's the sixty gallons!"

"The sign of *plus* between the terms in the first member, what does that indicate?"

"That the terms are added together!"

"And the sign between the two members, what does that show?"

"That the two members are equal to each other!"

At this moment the young man's patience was nearly exhausted. He had been severely tried and could scarcely conceal his disgust at the silly questions with which he had been annoyed. I paused for a few seconds in hopes that he might, by reflection, discover the object I was aiming at, and then remarked:

"You have a time, half of a time, and a third of a time added together, equal to sixty gallons; this measuring time by the gallon is something new to me, where did you learn it?"

The lesson which was given to him that day, although momentarily painful to his vanity, was, without doubt, one of the best lessons that he had ever received. It awakened thought, and led him to understand that every equation has an interpretation—that it is, in fact, the algebraic enunciation of some problem, and not merely a mathematical puzzle which he was required to disentangle by artificial rules.

On entering upon the study of the elements of geometry, the student should be informed that this science is strictly an abstract science; that however important and extensive its practical applications may be in the departments of surveying, architecture, engineering, &c., yet, for the present, he is to regard it as a purely intellectual study; that he will discover, when engaged in the mixed mathematics, that all practical operations are more or less imperfect; that there are imperfections of the sight, imperfections of the hand, and imperfections in the instruments which he will be called upon to use, but that the elements of geometry have no imperfections whatever; that the circles and squares and parallelograms therein discussed are perfect figures, such figures, in fact, as no human being has ever formed; that these geometrical forms exist only in the mind, and not in matter; that to aid him in his conceptions, he is allowed to draw the best representation of these perfect forms that he can; and that these imperfect pictures will suggest to him the figures and characteristics of those mental ones which he is unable practically to delineate.

He should also understand that the geometrical straight line is rigorously what it is defined to be—perfectly straight and perfectly breadthless—and consequently exists in the mind alone.

The hand cannot always perform what the mind may conceive; hence arises the necessity of postulates. We are asked to grant that certain things may be done, not because it is so easy to do them, but, on the contrary, that the performance is impossible.

What more simple operation can be *conceived* than that of drawing a straight line from one given point to another, yet what operation more impracticable *to be done*! For a geometrical line has only the abstraction, length; and length without breadth is impossible to be exhibited to the eye.

In like manner the student is to admit the truth of the several axioms, not because they are so easily to be proved, but simply and entirely from the fact that they are indemonstrable.

At his recitation, the student should not be permitted to finish his diagram before he begins the demonstration, but the construction and argument should proceed together; and no line should be drawn until it is absolutely wanted.

With these instructions, let him enter on his course. The task may be hard to him; the subject may, at first, be uninteresting; but, if he perseveres, he will be improved both intellectually and morally by the journey; he will be engaged in the study of demonstrable truth, which will excite and cultivate the best habits of his mind. Next to inspired truth, the truths of pure mathematics furnish the grandest materials on which the human mind can exercise its powers; and no one can be employed for any length of time in their contemplation, without becoming fascinated with their beauty.

Mental habits grow from seeds which are generally planted in youth. These habits become fixed by the trains of thought in which we indulge in early life. Hence the study of pure mathematics has an important influence in forming the moral as well as the intellectual character of the young. The man may forget every proposition in geometry which in his youthful days cost him so much labor and patient thought; he may not be able to recall the simplest deduction or the plainest corollary; still if the love of truth remains as a constant habit, he will have acquired a treasure more valuable than gold!

The reasoning faculty is cultivated by the study of the ancient geometry in a far better manner than by the study of any other branch of education in the whole curriculum, with one exception; that is the study of analytics.

Ardently as I am attached to the pure Euclidean geometry (and that attachment is founded on the consideration of its purely logical nature), I would recommend the student, while under instruction, to devote only six months to its pages. More than this would materially interfere with his successful progress in the

higher mathematics ; for the field is large, and the machinery with which he is to cultivate it and reap its fruits, should be the best adapted to the purpose. It would require no longer time than that I have mentioned, with proper effort of the mind, to learn and remember all the propositions in Legendre, and how each depends on those which precede it. Farther than this he need not advance.

Modern mathematicians have so far transcended all that the ancients ever accomplished, that in order to keep pace with them it becomes necessary for us to curtail the time heretofore bestowed upon the study of the old geometry and apply ourselves to that of the new.

Thoroughly to understand and retain in memory a system of analytical geometry requires persevering labor, unremitting industry and continued thought. Students sometimes fancy that they have a correct knowledge of this subject, when in reality they scarcely understand it. They are like the lad in my recitation room, of whom I have made honorable mention. They can combine their equations ; find the value of certain expressions ; substitute these in their proper places ; reduce and obtain the final result. This final result they can explain, from the fact, perhaps, that it is interpreted in their text-book. But they have not perceived that every step they have taken has a geometrical interpretation ; that the argument is complete in all its parts from the enunciation to the close, and that analytical reasoning and Euclidean demonstration are in many instances perfectly identical, except in the language employed in conveying them.

If the object of education were simply to enable a person to perform certain things with rapidity, without reference to mental discipline, I would unhesitatingly recommend the pupil to ignore the *method of limits* and pursue that of the *infinitesimal system*, in the study of the DIFFERENTIAL CALCULUS ; for the latter generally reaches the conclusions in a far less time than the former, and is, perhaps, more easily understood by the learner.

We cannot too earnestly recommend that every student in mathematics be required to interpret his symbols from the commencement to the close of his academic course. It will become a habit which will be of essential service to him through life. The comprehensive formulas of Lagrange in his *Analytical Mechanics* (a work which is based on the principle of virtual velocities, and is of a purely analytical character), include every particular problem

on that subject which may come under the investigation of the student, and therefore its solution is within his grasp, provided he has the requisite skill in analysis to make the proper transformations. But the ease with which these transformations may be accomplished by expert analysts renders it very important that the formulas of Lagrange be interpreted correctly.

In 1828 a controversy occurred among several of the most distinguished mathematicians of that time: "*And there were giants in those days.*" It arose from the solution of a problem on *investigating the vibrations of a rolling plate.*

Their results were obtained by the application of a formula of Lagrange—one making certain modifications in consequence of the transformed variables being connected by incomplete differential equations; another omitting to do this. Hence the discrepancy and the controversy which the problem engendered.

I have not the assurance to pronounce which of these gentlemen was right, for when such eminent doctors as they were, differed, it would be presumption for me to attempt a decision.

It has been asserted by some that the study of mathematics has a tendency to make men dogmatic and peculiar in their actions. No doubt the pursuit of any one branch of education, to the exclusion of all the others, will cause a person to assume some peculiarity of manner different from the rest of his species; whether that branch be the exact sciences, chemistry, history, or the ancient classics. The true theory is that man should be trained in all his intellectual powers; that mathematics should keep pace with belles-lettres; modern and ancient languages with metaphysics, etc., and that all these should be so read and so studied as to become part and parcel of our breathing thoughts; that when this system is thoroughly pursued, the result will be, not a one-sided individual, but a liberal scholar and a perfect man.

It is the one-sided individual who is apt to have his mind filled with crotchets. At one time he is engaged in "squaring the circle." To do this he sometimes adds to the length of the radius a definite quantity, which he tells us is the width of the circumference—a correction which all other mathematicians have erroneously omitted. Again: he assumes as an *axiom* that one-fourth of the circumference is equal to the length of its chord *plus* the versed sine of half the arc, which in ordinary language means that he guesses at one-quarter of the length and multiplies it by four.

One of these half-educated gentlemen, in the beginning of the



present century, discovered that the Principia of Newton was a stupendous fraud; and after having read De Saint Pierre's Studies of Nature, as he very modestly informs us, he was enabled to account for the diurnal rotation of our globe on its axis from the application of his new principles of gravity and motion, in this wise, which is as transparent as mud: "The vertical point of the sun is the central point of gravitation to the waters of the ocean; the vertical flame of the sun forms a vacuum; the gravitation of the waters to this vacuum gains a preponderating heft to the opposite part of the globe, and the heft of this tidal wave climbing up from east to west causes the earth to revolve on its axis!" He might have gathered this idea from seeing a squirrel running up the outside of the wheel attached to his cage!

Another gentleman, about twenty-seven years ago, was more ingenious in his views upon this same subject. His essays, which were published in the NORTHERN LIGHT, a paper issued in this city (Albany), showed that there was a system of cross-banding round the sun and our globe which performed the rotation equal to any *other* well-adjusted machinery.

It is not in mathematics only that men show a mental obliquity. We sometimes observe it in those who have devoted all their time and talents on some other hobby. A poetaster who was thoroughly convinced that his lips had been touched with a live coal from off the altar of the Muses, once presented himself at the Free Academy for the purpose of electrifying the students with specimens of his immortal gift; but signally failed in his performance. He was positively certain that if he should strike the harp from which the "Sweet Singer of Israel" drew such inspiring strains, that it would be the harp's fault if it did not reproduce them!

It has been asserted also that the study of mathematics has caused much infidelity among its votaries. Let us examine the case.

Although it is impossible for the human intellect to grasp the full idea of a Supreme Being who has existed from all eternity, still that mind which has been trained in exact science can approximate more nearly to its comprehension than the one which has not had the benefit of such discipline. The study of mathematics teaches us, to a certain extent, to subject infinity to measurement, and enables us to reason upon it with as much infallibility as if we were able to understand the immense idea.

The theory of curves furnishes us with an admirable illustration of the doctrine of infinity. The axes of a parabola are both

infinite, yet one of them is infinitely greater than the other. The continued arc and the asymptote of a hyperbola are both unlimited in their extent, yet if the infinite length of the one be taken from the infinite length of the other, the remainder will be a finite and measurable quantity.

To the mathematician it is perfectly evident that one quantity may continually approach in value to another quantity without the possibility of ever attaining it; and there is no doubt in his mind of the validity of the argument, drawn from the nature of the soul, that it may continually approach the perfectibility of its Divine Author without ever reaching that degree of perfection.

The mathematician obtains one invariable law for the generation of a family of curves, and finds that the forms, inflections and curvature of these curves can vary *ad infinitum*, while the law of their formation is as unchangeable as the nature and purposes of the Deity!

Can any reasonable being say, then, that the study of a science which discusses such themes as these—that the study of a science which also explains the phenomena of nature, has a tendency to make its votaries deny the existence of a Supreme Being, or to disbelieve the divine authority of the Holy Scriptures? Certainly no mathematician will utter so great an absurdity.

Tom Paine was an infidel. He explained the darkness at the crucifixion as being caused by an eclipse of the sun! But Tom Paine was not a mathematician, and invading that province, he placed his feet on slippery ground and fell! Any ordinary farmer who is in the habit of consulting his almanac, could have told him that an eclipse of the sun never happened at the full of the moon!

The liberally educated man has no idle conceits. He looks upon the world around him with far different feelings and emotions from those of the one-sided or half-educated man. From the smallest flower that spreads its petals at his feet, to the most distant planet which he discovers with his telescope, he sees a written history of Almighty power and Almighty goodness. Throughout all the works of creation he discerns that everything is in perfect harmony with everything else; that each is performing its own proper functions; that all proclaim a power infinitely great in conception of the systems, infinitely wise in their arrangement and disposition: and in the fullness of his heart he is ready to exclaim with the Psalmist,

*"Divinus est Artifex qui nos creavit."*



## A LETTER ON THE EDUCATION OF GIRLS.

[See Minutes of University Convocation, page 17.]

PACKER COLLEGIATE INSTITUTE,  
BROOKLYN, *June, 1867.* }

A. CRITTENDEN, Esq. :

Dear Sir—You have requested me to describe a course of study, suggested by experience and by consultation with other teachers, suitable for the education of girls. The subject, though certainly familiar, seems to me encumbered with some difficulties, as well from its extent as its limitations. Education, in its general purposes and methods, must be alike for girls and for boys : but if we contemplate that more especial training which should fit woman for her particular sphere in life (which, after all, is but a hemisphere), we must take into account a great variety of circumstances, requiring widely different kinds and degrees of culture. The drawing-room, the sick chamber and the nursery, no less than the school or the editor's desk, require each their special course of preparation,—more especial, indeed, than has usually been accorded. While the out-of-door professions of men are acquired only by a severe and well-defined system of study, it has been too easily assumed that woman can come to her arduous duties with no other fitness than a good will for her task, and such facility as chance emergencies may have called forth, or imitation of chance models developed. But of these special departments of training I will speak hereafter.

Concerning education in general, it need scarcely be said that no living thing is ever created at its highest point of development. Whatever may have been true of the first man, his descendants certainly enter the world, the merest germs of what, as sentient and rational beings, they are intended to become ; and the unfolding of each separate faculty to its fullest strength and activity, in the realization of the Divine idea, is the ultimate purpose of what we briefly call education.

Of course the process is very seldom undertaken or pursued with so elevated a conscious aim. Usually, the awakening of this or that faculty of the soul is due to casual circumstances ; and in rude ages, the passionate, force-giving attributes gain a disproportion-

tionate strength. "Mighty hunters" make the greatest figure in primitive history. If the finer and sweeter traits of human character exist at all, they are so concealed by the clash of swords and the tramp of armed hosts that their voice is not heard.

Afterwards when it is discovered that knowledge is power, some sort of mental training will be attempted, though still with reference to immediate results. Thus, savage nations cultivate the eye, the ear, and the sense of smell to remarkable quickness; while a despotism develops the powers of deception in the people, and of finesse and shrewd diplomacy in the nobles,—and a free republic calls into unusual activity the arts of eloquence by which popular influence may be gained. The Persians of the time of Cyrus taught their children "to ride the horse, to draw the bow, and to speak the truth;"—one moral and two physical accomplishments filling the whole measure of their training.

The mediate ends of study, either for boys or girls, may be readily divided into two: Knowledge and Culture. Some things we learn for their practical application, others for their strengthening, moulding or refining effect upon the mind. The first may predominate in the education of men;—the latter, I am sure, must be especially kept in mind in the training of women.

The two purposes, indeed, co-exist, and are never opposed to each other, unless it may be in the relative allotment of time. They may often be attained by the same methods, but the one demands only a limited array of means, while the other lays every department of knowledge under contribution. The same study of arithmetic which prepares a child for the petty transactions of the market, may at the same time define his conceptions of number and cultivate the power of patient thinking; just as the mathematician, while taking a given arc of a meridian, which shall determine a standard of measures for the commonest uses, may himself be gaining a grander reach of thought as he feels out along his vertical lines to distant stars, and realizes the vastness of the universe which is yet under the fixed control of law.

It is by regarding too exclusively the first object of study, that narrow utilitarian notions have crept into many schemes of education. The part of our knowledge which can ever be applied to practical uses, is indeed small; but if the growth and culture of the mind be the end, then no array of means can be too ample. Time and circumstances must, indeed, control in a great measure, the choice of studies; but for the ultimate purpose of education,

there is absolutely no danger of too much culture. If "no woman can rightly set a table or arrange a parlor without knowing the definition of a right angle," then we shall easily believe that higher attainments in science and literature will have their effect in adding grace and dignity to the character.

It should be remembered that some studies are means far more of moral than of mental culture. Mathematics teach patience and a firm reliance upon absolute truth; natural philosophy, if pursued with experiments, cultivates that quiet and perfect obedience to law which tranquilizes and dignifies the life; astronomy penetrates the mind with a sense of the vastness of the universe beyond our finite faculties even to perceive; and all sciences, in their ultimate results, teach humility. "Into the kingdom of knowledge, as into the kingdom of Heaven, one must enter as a little child;" and it is precisely this higher effect of study upon the soul that we can least afford to lose.

In the order of training, the natural order of the unfolding of the faculties should be implicitly followed. The perceptive powers are first awakened, and the morning period of brightness and freshness should by all means be improved in the gaining of truthful impressions of material things. Forms, colors and the qualities of objects; sounds, intonations and the common forms of language; the facts and phenomena of insect and animal life; all make a clearer impression upon the child than the adult; and, therefore, the details of natural history, and all the familiar science of *things*, can be learned then with half the labor that in later years would be required. Eye and hand may be disciplined to skill in drawing, and a facility acquired which, in maturer years, would be sought in vain. In the hands of an accomplished teacher the crayon and the blackboard will be invaluable aids throughout the course. Foreign languages can be learned by little children almost by natural absorption; but this should be accomplished, I think, with the least possible use of books. The principles of grammar belong to a later period; and there can be no greater injury to a childish mind than to burden it with arbitrary rules which it cannot understand, crushing out that vivacity which constitutes its best fitness for its own peculiar work.

The memory of a little child is quick to receive, but not strong to retain. Care should therefore be taken not to weaken it by overloading, especially with things not readily assimilated. As it becomes strengthened with years, the main events of history

ought to be communicated, and this in a manner at once systematic and vivacious. Bare lists of names and dates, royal dynasties and battles and treaties, are burdensome enough to the older student, and must be intolerable to a little child. Moreover, it is an insult to a child's understanding to impose upon it words without a vital meaning in them; and the effect too often is to stultify and even obliterate the reasoning power. Still, history is a necessary part of any intelligent scheme of education, and it may be made attractive to children from eight years old and upwards by sufficient effort of imagination on the part of the teacher. Every name should be filled with life, and the shadowy persons of past centuries made to move before the student as breathing realities. In this way history fulfills its most important use as a study of human nature,—that nature which in all its weakness and its pride, its petty passions and its lofty assumptions, we hold in common with kings and popes and barons, from whose conflicts and achievements on the greater stage we may derive models and warnings for our own. History has another use, which I think is seldom noticed, namely: the enlarging of the individual consciousness and the emancipation of the mind from the narrow bounds of personal interests and prejudices. We breathe through the lungs of the whole race, and we inhale a larger life. Even from the crimes of our brother-men we learn charity and humility; from instances of their sublime self-sacrifice we gather inspiration to noble deeds; from their errors in judgment we infer the necessity of prudence; from the fatal end of their ambition we learn moderation in our desires. If man of to-day has gained anything in intelligent dominion of the forces of nature, it is because he can concentrate in himself the aggregate life of his species, and literally

"Rise by stepping stones  
Of their dead selves to higher things."

The mathematics, from their lower to their higher grades, will usually extend through the entire course of study, and as means of culture I believe they are even more needful for girls than for boys. A true candor ought surely to inquire how much of that frivolity, of which women are often rightly enough accused, may be traced to an utter want of those habits of steady thinking which should have been formed in the nursery and strengthened at school. All uneducated persons, and not women alone, are addicted to vague and inconsequent habits of thought; and before we con-

demn too severely the results, it might be well to discover, and, if possible, remove the cause. I doubt whether any other discipline will answer the purpose of this hard logic of mathematics in giving toughness to the mental fibre, certainty and precision to the judgment, and accuracy to all the habits of the mind.

Still, an exclusive or disproportionate attention to mathematics will be likely to cultivate strength without flexibility or grace; and while the feminine mind may be in especial need of this heroic training, it will almost always find a more congenial exercise in the fields of language and literature.

The advantages of the study of foreign languages are too commonly admitted to need enumeration here. The structure of our own vernacular can never be rightly understood except by comparison with others; and it is often remarked that children who inherit two languages, use both with greater intelligence than even those of better scholarship who are confined to one. The study of the sounds of a foreign language gives greater refinement and accuracy in the pronunciation of our own; and as a means of literary study, it is obvious that a choice of the masterpieces of several nations is preferable to exhausting the commonplaces of our own. But the most immediate advantages of linguistic study—especially in so cosmopolitan a nation as our own—is found in its practical applications; for the two purposes of knowledge and culture are here admirably combined. For women, above all, in their social and sympathetic duties, these attainments are above all price. It is of little real use to “know the heart of a stranger,” unless we possess some means of communication with him; and intellectual culture is never so precious as when it administers those sweet and graceful hospitalities which alleviate exile, and establish a common intercourse of thought and feeling throughout the world.

No very extensive study of literature can usually be included in an academic course, and indeed in this, as in all other departments of study, the work of the school is rather to define and regulate the tendencies of the mind and inspire right impulses, than to complete the education. Still no girl should leave her school without some acquaintance with the great writers in her own language, as well as with the chiefs of the world's literature. In no department is there more need of a just discrimination on the part of the teacher, bringing only the choicest results of extensive reading to the class. And never was there more urgent need



of a rigorous discipline of taste than now, when the causes which corrupt language are so active and powerful. A return to the good old English writers cannot but be healthful; and every graduate from our academies should have acquired such familiarity with the purest models in her own language as to have conceived a thorough disgust for the slang of the newspaper and the diluted sentiment or sensational glitter of modern fiction.

Beside this acquaintance with the best models of style—indeed preceding it to some extent—should be a thorough and systematic training in the arts of expression, beginning with the earliest lessons of the nursery and extending through the academic course. It is needless to dwell upon the importance of English composition as part of the discipline of our schools. No other kind of study so exactly fills the meaning of the word Education. Our text-books of science have for their object to fill the mind with a knowledge of natural or metaphysical laws; the practice of composition, rightly taught, demands the reproduction of that knowledge in a manner that cannot fail to give clearness and precision to the mental operations. Whatever reasons can be adduced in favor of any systematic training of the mind will apply with peculiar force to the study of written language, that exponent and guardian of all civilization, that priceless jewel, committed anew to every generation to preserve untarnished, or, if it may be, to polish with new brilliancy and reset with new adornments.

In our hurrying age, with its rapid circulation of thought, its intense activity of intellectual forces for good or evil, its urgent need of enlightenment for the solution of social and legislative problems, the practical importance of written language is increased a hundred fold. The educated mind of the nation must be able to express itself in unmistakable and convincing tones. The number of those who speak through the press is every year increasing. Whether we will it or not, women are to have a large share in preparing this mental food for the public, and while our schools are training those who are to give character to the American literature of the next half-century, it is of some consequence that teachers shall be impressed with the responsibility they hold.

It is very true that this labor for the public is not the only nor the most important use of the pen. Who does not know the charm of friendly letters, sprightly, graceful and sweet? The unaffected wit, the easy flow and quiet rippling of fancy, are certainly more beautiful—contribute more to the happiness of the favored reci-

pient,—than any more labored and pretentious effort. But in most cases the best results of literary study will be found in conversation. If we consider our English language as a precious trust committed to the care of all who speak it, we cannot but fear lest it may suffer some injury from the reckless admission of new and unauthorized words, and the loose, uncultivated style which is too often suffered to prevail in our social converse. Pure Latin, we are told, was spoken among the noble women of Rome, long after Roman literature had lost the classical purity of the Augustan age. It cannot be doubted that women are the natural conservators of purity and refinement, as well in language as in life. Is it not most needful, then, that their principles should be justly formed and their taste chastened and refined?

I know not whether a mention of the sacred Scriptures, as an essential part of every woman's education, falls properly under this head; but for every kind of discipline, mental and spiritual, they seem to me indispensable. Cowper said, "Intense study of the Bible will keep any writer from being vulgar in point of style;" and if literary culture alone were in view, King James's version of the Scriptures could not be disregarded, as, in truth, our purest "well of English undefiled." With regard to its moral and intellectual bearings, the authority of the late Dr. Arnold, of Rugby, is of great weight; and one of Dr. Arnold's most distinguished pupils, the present learned incumbent of the chair of Ecclesiastical History at Oxford, justly complains that "many who would be scandalized at ignorance of the battles of Salamis or Cannæ, know and care nothing for the battles of Beth-horon and Megiddo."

The power of abstract reasoning is latest in order of development among the faculties of the mind; and metaphysical studies must therefore be placed last in any course. Unhappily, in the education of girls, they can seldom come late enough to exercise the mind in its maturity of power. If the course of study is to be ended at sixteen, I should omit altogether mental philosophy and the higher branches of evidences of Christianity. The latter, if superficially studied, can only serve to suggest doubts which might not otherwise exist, and which cannot be thoroughly dispelled.

In thus lightly touching upon a few main points in the scheme of a girl's education, I have omitted two whole departments of prime importance, only because they seem to me to belong rather to domestic than to academic training. Physical culture and in-

telligent care of health should certainly give place to no other interests ; but I know not how these can be secured during the hours usually appropriated to studies in school. Calisthenic drill in the interval of lessons may have a certain use, especially if accompanied with a change of air ; but it misses the chief health-giving power of muscular exercise, which demands for its best effects perfect relaxation and freedom of mind. The first ten years of a girl's life are well spent, if without stifling her mental or blunting her moral perceptions, she has gained from many an hour's careless play in the open air, a hardy and vigorous physique. It ought, however, to be remembered—what is almost always forgotten—that a certain degree of mental activity is absolutely essential even to physical health, and that the natural intellectual force of children is much better if, neither repressed nor unduly stimulated, it is directed to useful pursuits, than if allowed to spend itself in idle vagaries. These two departments of our being can be antagonistic only when one or the other is indulged to pernicious excess. But the whole physical training of the child belongs rather to the mother than the teacher. For *her* most responsible duties, the school should have provided instruction, as well in the special department of physiology, as in that sober balance of mind which will lead to right reasoning and prompt, efficient action even in untried emergencies.

The department of domestic economy belongs equally to the especial training of a home. And yet it is greatly to be wished that in this humble department of financiering, some general principles might be established, and deeply impressed on the mind of every one who is to have the ordering of a household. "The heartless extravagance of American women" has become almost proverbial. And yet we must not forget that

" Evil is wrought by want of thought,  
As well as by want of heart ;"

and that want of thought is a very certain result of want of education. Many a woman who, with an income of two thousand, projects her household expenditures on a scale of ten thousand a year, does so without the least disposition to recklessness or dishonesty ; but simply from ignorance of the market value of so many dollars and cents. The household training of young girls might apply a very simple remedy for this ; but it can scarcely be included in a scheme of academic instruction.

I have only to add, dear Sir, that if in these too extended and still most imperfect notes, I have used the dictatorial phrases, "must" and "should," rather than—what was always in my mind—"so it appears to me,"—it has been only for the sake of brevity, and does not indicate any certainty that my impressions are in accordance with the truth. No general rules can be made to embrace all cases. To theorize is easy : the real difficulty of the teacher's work begins where theory must be reduced to practice, and the infinite variety of character and talent which lies before us in the school room is to be met by an equally various system of instruction, repressing this tendency, stimulating that, and holding an even balance of checks and encouragements through the ever changing incidents of academic life ; almost, if one might presume to compare small things with the greatest, like a little Providence in a tiny world, where good and evil are working out their conflict, though in a petty field, yet in real semblance of the greater world without.

With unfeigned diffidence of the value of this or any other scheme that I could frame, yet as a slight contribution to the great cause in which we are engaged, this little sketch is respectfully submitted.

M. E. THALHEIMER.



A. M. D. G.

## THE STUDY OF PHILOSOPHY.

BY REV. LOUIS JOUIN, S. J.,

*Professor of Ethics, and Civil, Political and International Law, in St. John's College.*

It is an undeniable fact, that the study of Philosophy is, in the estimation of all enlightened and polished nations, one of the most important branches of a liberal education. All universities, all colleges, whether in Europe or in this country, hold as an indispensable condition for granting academical honors to their Alumni, that the graduates should have pursued with success a course of lectures on Philosophy. Yet, though among educated men there can be no possibility of disagreement on this point, it must be acknowledged, that, in our days, a great diversity of opinion prevails as to the matter which this course of Philosophy should embrace, and the manner in which it should be taught. As it is the aim of the University Convocation to devise means for raising to the highest possible standard the studies in our colleges, I have taken the liberty to present a few reflections on both these subjects.

Philosophy is generally divided into two branches, natural and mental. Natural Philosophy embraces the exact sciences, as they are called, the investigation of the general laws which govern the visible world, and the study of chemistry. Mental philosophy treats of those objects which transcend the domain of our senses; and which Aristotle justly called τὰ μετὰ τὰ φυσικά, or metaphysics. It cannot be doubted that the study of mathematics and of the natural sciences is of the greatest importance. Mathematics are calculated to discipline the mind of youth, and strengthen their reasoning faculties. Nor was this truth unknown to the ancient philosophers, for even Plato required that his disciples should have studied mathematics before they entered on the study of philosophy. Physical sciences store the mind with much useful knowledge, and many are the practical results to be derived from them. But, if in our colleges we were to cultivate these sciences to the exclusion or almost total neglect of mental philosophy, we should fail in one of our principal duties as public instructors. It cannot be our aim to make great mathematicians

of all the young men who graduate in our colleges. Mathematics and the natural sciences embrace too extensive a field to be thoroughly seen during the collegiate course. Our best text-books are but elementary works, and we may indeed be well satisfied if the students master them, and if those, who at the close of their college career wish to devote themselves to these sciences, be enabled to pursue their mathematical studies with advantage.

The study of mathematics, as taught in our colleges, is not the chief end of a collegiate education, it is but a means. This end, I need not say, is to train the minds of young men, and to develop their reasoning powers. To attain this result, their minds must be imbued with such principles as will enable them to become not only learned men, but also good citizens, capable of directing the thoughts and opinions of those who have not enjoyed the benefit of a liberal education. Now this end cannot be well attained without devoting our attention to the study of metaphysics. It belongs to the province of metaphysics to establish on a firm basis the most general principles of reason which underlie all other sciences; to show the objectivity of our primary ideas, such as the idea of being, essence, substance, quality, relation, cause, effect, and so forth; to analyze these ideas and rightly to classify them; to investigate the general nature of things corporeal as well as spiritual; to establish the spirituality and accountability of the soul; to prove the existence of the Supreme Being, and to determine his attributes, as far as human reason may discover them, in the perfections he has imparted to his creatures. To mental philosophy likewise belongs the investigation of the principles of ethics. Having established the true destiny of man here upon earth, we must, from the consideration of the relations which subsist between us, our Maker and our fellow-beings, deduce the various duties imposed upon us. We must treat of society, domestic as well as political, examine their origin, authority, rights, duties, the relations in which they stand one to another. How can he who is not well versed in these subjects presume to guide and direct others?

The study of metaphysics, decried through it may be, is far more important and necessary than the study of mathematics and physical sciences. A man who is ignorant of trigonometry, analytical geometry, and of the principles of the differential and integral calculus, though he lacks part of that knowledge which should adorn the mind of every well-educated person, may never-

theless be a good statesman, be thoroughly conversant with all the principles of right and justice, and be fully capable of guiding aright the thoughts and opinions of his fellow countrymen. But he who has no clear perception of the principles of metaphysics, will necessarily be exposed to the danger of being betrayed into many errors which oftentimes may be productive of the most baneful consequences.

There can be no doubt that the young men who graduate in our colleges should be so trained as to be able in after life to exercise a healthful influence on their fellow citizens. Some of them will be called upon to sit in our legislative halls; some to occupy the benches of our magistracy; others to mould, by their writings, the thoughts and opinions of the community. We cannot presume to communicate during the collegiate course all the knowledge necessary for the fulfillment of these duties; many years of earnest study will still be required. But if we do not endeavor to instil into the minds of our graduates a clear perception and a sufficient knowledge of the principles of ethics, of the primary laws of right and justice, the aim of their education will be missed. Now the knowledge of the principles of the moral law, and of the rights as well as the duties of man, depends on the right perception of the primary ideas which are analyzed in metaphysics. Our duties towards God and our fellow men rest on the relations which obtain between us, our Maker and our fellow men; and these relations flow from the very nature and essence of these beings. If, then, we do not rightly conceive and apprehend these relations, if we misunderstand them, it is clear that we must err alike in the knowledge of our duties and of our rights. Thus, for example, if the idea of cause and effect be not clearly conceived and sharply defined; if the true meaning of cause be not well understood and carefully distinguished from a mere succession of events, from occasion, or from the condition necessary for the production of an effect; if the principle of causality be not firmly established, we must needs lack the means of demonstrating the existence of the Supreme Being. And if this truth be not placed beyond doubt and cavil, the foundation of all social science, of the very existence of a moral law, is swept away, and Atheism or the vagaries of Pantheism set up in its stead; for Pantheism rests only on the misunderstanding and the confusion of the ideas of infinity, necessity, contingency, essence, substance and causality.



If young men who enjoy a liberal education, and who read the productions of modern literature, be not well trained in analyzing and clearly understanding the primary thoughts of the mind, it will be all but impossible for them to escape the subtle poison of Pantheism, with which modern writings teem, and which the unwary almost insensibly imbibe. On the confusion of these ideas hinge all the errors which in our days desolate and convulse human society; on this confusion are based all the new-fangled theories which lay claim to the furthering of the progress of the human race, but which, if fully carried out, would inevitably plunge mankind into the deepest misery. The mind of man is so constituted as to be incapable of yielding assent to error proposed in its naked deformity. Every error, therefore, must be presented to it under the guise of truth. Our primary intellectual ideas are a common inheritance, bestowed by the Creator upon all men, whether learned or ignorant, civilized or barbarian; but being general ideas, they are liable to be either misconceived or misrepresented; and this misconception or misrepresentation is the means used by those who unwittingly or maliciously spread their erroneous doctrines among the people. The true progress of individuals, as well as of human society, does not depend mainly on our advancement in the knowledge of the sciences and arts which contribute to our material well-being. This progress is no doubt necessary—it cannot, it must not be neglected; but we must not lose sight of the moral training to be given to the young men confided to our care. We must instil into their minds and hearts a well grounded knowledge, and a true love for the principles of right and justice, which principles, being based upon the relations existing between us, our God and our fellow-beings, cannot be scientifically known without a careful study of general metaphysics or ontology.

It cannot be denied that this study is dry, and, for the most part, not very palatable to the students; that it is involved in many obscurities, embarrassed with many perplexing difficulties. Yet this disadvantage, if disadvantage it be, metaphysics shares with all other sciences. The beginnings of all sciences are difficult and tedious. The first principles of all other sciences are, speaking generally, not less obscure than the principles of metaphysics; for, after all, it is from this latter science that they have to borrow them. Great difficulties are not raised against the first principles of mathematics; not because none can be found; for

though space be readily imagined, it is not for that more easily understood. The only reason why grave objections are urged against the principles of metaphysics is on account of their immediate connection with the duties we owe God and our fellow-men. Were these duties to be inferred from the principles of mathematics, these principles would be called in question no less than those of metaphysics. Many truths in metaphysics may be known with as much certainty as the axioms of mathematics, and many deductions from them are as incontestable as any geometrical theorem.

I shall add a few words on the method of teaching philosophy. In our colleges we use the scholastic method. This method is not an *a priori* method, which discards all experiments. Schoolmen did not reject, as is but too often supposed, the experimental method; their only mistake was that in the matter of physical sciences they often based their reasonings on faulty or insufficient observation. Yet it must be borne in mind that they were not provided with all those means of experimenting, which, at present, are at our disposal. And even modern natural philosophers are sometimes tempted to hazard explanations of observed facts, and to broach theories which may excite the risibility of posterity just as much as the strange conceptions of schoolmen excite ours. Nor is this method wedded to any particular system of philosophy. The Cartesian, the Platonist may pursue it as well as the staunchest adherent of Aristotle. The main features of the scholastic method are these: The professor proposes the thesis or proposition he is about to explain, not academically, but as a professor of geometry proposes a geometrical theorem. Every term of the proposition must be sharply defined and clearly explained, and the proposition itself proved in strict syllogistic form. This done, he states in detail the various objections that may be urged against the thesis, and establishes the principles on which their solution rests. The students are not only required to repeat the thesis propounded by the professor in the forenoon lecture, but at the afternoon lecture they must be ready to maintain that thesis against the attacks either of the professor or of some of their fellow students previously appointed. Yet the attack as well as the defense must proceed syllogistically. The defendant begins by proving his thesis; this done, the objector states his objection in syllogistic form. The defendant first repeats it, then examining each proposition, either grants or denies it, or distinguishes its

meaning, as the case may require. The objector in his turn takes up what was denied, and the conclusion of his next syllogism must be the proposition denied by the defendant. Thus they proceed till the subject is exhausted. This exercise takes place from time to time before the whole faculty. The semi-annual examinations are conducted in the same manner.

The advantage of this method is, that objections are briefly and stringently urged, the answers clearly and concisely stated, all verbiage and needless disputes avoided. Both the defendant and his opponents are bound to confine themselves to the point at issue, to argue it thoroughly, nor are they suffered to deviate from it to any irrelevant question. Either the defendant cannot maintain his position, or the objector is reduced to silence, upon a true and full solution being given.

This method has another advantage. The students learn to reflect, to analyze their thoughts, to systematize their ideas, to propound them clearly and logically. Their memory is not only enriched with a number of sound principles, but they acquire a full comprehension of them ; for every question being viewed in all its bearings, is thoroughly understood. They are enabled not only to conceive clear ideas, but to propose them skillfully and to defend them successfully ; they gradually become close reasoners and expert debaters ; they become accustomed to seize immediately the drift of an argument, to dissect it minutely, and to give a clear and ready answer to the objections raised against them, if they but uphold truth or at least a well grounded opinion. The spirit of emulation is fostered among them, for no one feels a pleasure in seeing himself worsted in argument by his opponent. Thus even the dry and unpalatable study of metaphysics may be rendered interesting and attractive, particularly if the professor fails not to show how the misapprehension of metaphysical principles may exercise, or has actually exercised, a most baneful influence on the moral order, the laws of right and justice and on the social weal of nations.

It might perhaps be objected, that this method is apt to beget in the students a taste for pedantry, sophistry and hair-splitting. That the scholastic method has at times been most strangely misused is beyond question ; but its occasional misuse is no reason for its rejection. It is for the professor to see that the students in arguing do not indulge in mere quibbles, that they propose real and serious objections, that the defendant solve them, not by

shirking the question or perplexing his opponent with unmeaning distinctions, but by giving a clear and solid answer. Thus the minds of the students will be well trained, the danger of mere logomachy avoided, and no taste for hair-splitting distinctions fostered. Furthermore, the students are obliged to write essays, and so to treat their subject, that, while in the expression and development of their thoughts, they are bound to adhere to the rules of sound logic, they are not at liberty to discard the ornaments and graces which the study of rhetoric and classical literature affords.



## EDUCATIONAL ECONOMY.

BY DAVID MURRAY, Ph. D.,

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The domain of science is infinite: the powers of the human mind by which this science is to be mastered are practically finite. It is the universal experience that the more man knows the more he sees to be known. The farther he travels along the road of knowledge the farther he sees it stretching away into the distance. The more he improves his modes of examining the phenomena of nature, the more difficult seems the task of discovering her ultimate secrets. The astronomer of the present day with his wonderful telescope seems to find just as much of space to be penetrated as Galileo did with his little tube. The microscopist, with every higher power he can employ on his microscope, finds still the same multitude of infinitesimal forms just hovering beyond the boundaries of his perception. The reason of all this is obvious. Human knowledge has to do with time and space, and phenomena co-ordinated in time and space, and both are infinite. Hence no man can know everything. Hence too great extent of research must in general be at the expense of depth and thoroughness; and hence, thirdly, for the most economical pursuit of science, and for the attainment of the greatest aggregate of human knowledge, there must be a division of labor instituted, so that the labors of individual men shall be restricted to specific subjects.

As a branch of political economy, this principle has long been recognized. It is universally known and conceded that there is a maximum of product with a minimum of labor when the workman is employed to do repeatedly the same operation. There is a certain nicety of judgment, and a certain manual skill, which can only be attained by constant attention to one thing. The hand that could cut and polish the facettes of a diamond could not also wield the hammer which forges an anchor. To temper watch springs, to blow glass, to refine sugar, to fit and gear machinery, to make a shoe, or a coat, or a felt hat, or a piece of point lace, requires for each a different and peculiar skill and knowledge, which can only be acquired by making that one thing a constant occupation.

The doctor's skill to detect disease from the presence of symptoms, is a different skill from that of the advocate who convinces a jury by an ingenious argument of the innocence of his client. A journalist who must treat of the topics of present and pressing interest, requires a different kind of talent from the man who shall direct the complicated concerns of a railroad or a factory. Success in any profession or business depends on a knowledge of a special set of facts, or at least facts which are to a certain extent special, and upon a natural or acquired dexterity in dealing with those facts. So that it has come to be recognized as indisputable, that education for these various positions in life, and the training for their skillful performance, must to a considerable extent be varied to suit the several cases.

Again, the aggregate mass of human knowledge is constantly on the increase. Every year the facts of science are vastly multiplied. History, philology, ethnology, metaphysics, are every year being enriched by new contributions from the learning and research of students. To fill the posts of statesmanship and diplomacy requires a very different kind of preparation than it did a century ago. The general interests of humanity, the recognized interdependence of all branches of human affairs, call for a breadth of cultivation in those who would perform any useful part in the world's affairs, which was unknown in a past age.

The time was, and not very distant either, when a single man might aspire to grasp all human knowledge. Cicero, or Aristotle, or Sir Philip Sydney, or Sir Thomas More, might almost without exaggeration or improbability be believed to have mastered all the learning and accomplishments of his time. In those earlier times, it was not difficult for the same man to combine within himself the power to perform with distinguished success classes of duties that are now considered utterly distinct, if not incompatible. Sir Thomas More was not only the most learned jurist of his time, but in theology and in classical and metaphysical learning was not unworthy to be the compeer of the great Erasmus. Cardinal Wolsey could pass without difficulty or embarrassment from the duties of the priest to those of the statesman and diplomatist, and to those of a Lord High Chancellor of England.

Not so now. The great lawyer must become so by making law alone his life study. To be a great astronomer requires the labors of night and day inspired by genius of the highest kind. There are a score of departments in natural science alone, any one of

which would require the life labors of any man. The men who have pushed science outward to its present boundaries have done so by the devotion of their talents and energies to special branches. The men who have become most famous in law, medicine, theology, history, philology, mathematics, natural history, are men who have relentlessly limited the fields of their inquiries within boundaries so narrow that they were able to compass them.

Now education may be defined to be the preparation of men to fulfill in the best way their duties in life. Plainly then, as the world changes, as society changes, as the wants and interests of mankind vary from age to age, education ought to vary too. It will not do to train a mining engineer of the present day as he was trained in Tyre or Sidon. Cicero, with all his eloquence as an advocate, would have to undergo a new education before he could succeed before an American or an English court of law. It will not do to educate the Englishman and the American alike, because the circumstances in which they are to be placed are such as to require in each peculiar qualifications. It is unphilosophical then to say that institutions of learning must undergo no modification. Like all the living and active agencies in human affairs, they must have a power of adaptability which will enable them to meet new emergencies with new resources. It does not at all follow that because a peculiar form of institution is successful in one land and age, it will of necessity succeed when transplanted in time and place. To fulfill their design in giving the best culture and training to men, there must be a sympathy and an accordance kept up between the spirit and wants of the age and the institutions whose province it is to educate men for their duties.

I have no sympathy, however, with that narrow feeling which would lower institutions of learning to the level of the ordinary wants of society. On the contrary, it is their peculiar province to occupy a position above the ordinary range of thought and action, and by their influence draw men up to a higher culture. While they faithfully train men for all the practical emergencies of ordinary life, they ought to aim at the same time to impart aspirations for a nobler life. American citizens, especially, for the proper appreciation and discharge of their peculiar duties, demand much more than a bare preparation for their business or their trade. They must be able to fill intelligently their positions as the responsible and ultimate sovereigns of their country. It would surely be a most defective education which would leave the



preparation to fulfill duties so important and so intricate, to the chance opportunities of the hour.

Besides, here more than in any other country, men exchange one sphere in life for another, one occupation for another. The wants of a new and growing country demand a supply of talent which cannot always be furnished by the usual channels. It is one of the peculiar glories of our land that the avenues for advancement are open to all aspirants, and no impediments are too great for the enterprising. It is a notable and cheering fact that most of the men who now fill the important positions in professional and mercantile life, have risen to them from obscure sources. We know not for what careers we are training the young men of to-day. The son of the farmer becomes the merchant prince or the eloquent advocate. This lad who blacks your boots to-day may one day lead your armies. These browned and dusty pioneers who are posting over the plains into the rich mines of new territories, will reappear at a future day as the honored and trusted representatives of future States. Transitions so extraordinary, and yet so constantly occurring, require a peculiar system of education. We must enlarge the scope of our studies and give what help we can to these aspiring sons of America. Versatility, that peculiar characteristic which American life demands, must be encouraged and cultivated.

To educate a man for a position in life requires two things: *First*, so to train his powers of body and mind that he shall have the mental and physical strength for his duties. *Secondly*, to furnish him with the requisite knowledge of facts bearing on his duties. A soldier is to be educated. He must be drilled in physical exercises to give him strength and agility; he must have mental and moral training to give him obedience, promptness, bravery, honor and patriotism. Then he must be taught the science of war, and all those kindred sciences which will be appealed to in the execution of his duties. The object of education, therefore, is twofold—to furnish discipline and to furnish knowledge. While these two objects of education are thus theoretically distinct and separable, practically they merge one into the other. With regard to very few, if any, branches of a good education may it be said *this* is purely disciplinary and *that* informational. Nor, indeed, is it desirable—it is not educational economy—to devise or employ, more than necessary, branches of study that cannot to some extent fill both these requirements.

If one study will furnish mental discipline at the same time that it will supply useful knowledge, it is surely to be preferred to another which will impart mental discipline alone. If teaching how to extract the square root will impart mental power, and at the same time furnish a useful expedient in many practical cases, we say it is to be preferred as an educational agency to teaching how to extract the fifth root, which may impart the former, but can only exceptionally prove to be the latter. A well devised scheme of education will aim to attain these two objects so far as possible *pari passu*, employing the same studies to impart at the same time useful knowledge and available discipline. The French Commission, with the illustrious Leverrier at its head, appointed to revise the requirements for admission to the Polytechnic School, recommended to strike from the arithmetical curriculum all those parts which treated merely of curious properties of numbers, and to retain and increase those parts which furnish commercial expedients or were essential to the profitable pursuit of subsequent studies.

It is a part of true educational economy to cut off all subjects of study which cannot be shown to be useful. It is a perfectly fair question, gentlemen of the convocation, when you are asked, what is the use of this or that study? We ought to be able to give a categorical answer with regard to every subject in a curriculum of study. If it cannot be indicated to the reason of men, it has no right to maintain its place there. At the same time we demand that the usefulness of the study should be understood in its widest sense. We do not mean that the term *useful* shall be restricted to refer only to physical wants, or to commercial interests. We claim for it the widest application; to the highest as well as the lowest wants of human nature. Whatever ministers to man's intellectual and moral advancement, whatever teaches how to enjoy the beautiful and the sublime in nature, are just as much, nay, far more useful than what merely supplies his physical necessities. Professor Martin, in his paper yesterday, nobly vindicated the usefulness of classical learning. He met its detractors on their own ground, and demonstrated out of their own mouths the indispensableness of a liberal classical education. To the scientific investigator, to the historian, to him who would speak and write his native tongue with precision and fluency, to him who would understand the nicer shades of thought which are displayed in the best of English writers, no other attainments or

culture will ever compensate for the deficiency of a knowledge of the classic languages.

The great want in American education now is expansion, not contraction. We must not talk of cutting off departments of learning from those now furnished by our institutions. It is a sad reflection that already they are not equal to the demand made upon them for the highest training. Hundreds of American young men, the best and most ambitious, are compelled yearly to go abroad to get what they cannot get at home. The merchants of the country are pouring into the lap of these institutions literally their millions; and yet to get for their sons the best culture, the most approved training in science and art, they are compelled to send them to Germany and France.

The colleges of the country must prepare themselves to meet this want. It will be to their discredit if they do not. And yet we should be met with the objection on the very outset, that colleges are already teaching all that the time which American students will devote to their education, will permit them to teach. And it is precisely here that I wish to urge attention to the principles of educational economy. It is true that the curricula of colleges are already too crowded. Much that they undertake to teach must be taught slightly and with most unsatisfactory results. The remedy must be in a division of labor. We must not demand that all students shall learn all subjects. In those studies which form the common basis of a liberal education, and are indispensable for the profitable pursuit of all the sciences—in such studies there must be careful and faithful instruction for all. But the necessity of the case demands that beyond this there must be the opportunity afforded for pursuing much further special elective studies. There is no other way in which the colleges of the country can furnish the requisite facilities for a higher education, as I pointed out in the beginning of this paper.

The domain of science is so vast that no man can compass it all. To make any progress beyond what is already made in any one of the great fields of human knowledge, a man must early devote himself assiduously to some special subject. Why should he not receive some help from his alma mater in this arduous undertaking? Why should the American scholar be compelled to enter on this life task without guidance and without help, and after he has left the college walls? Why must we tell our students, as we are

compelled to tell them, that their real education must be conducted by themselves after they leave college?

To those great institutions in our country which have received the most liberal endowment, this subject commends itself. They are in a position to take action to adapt themselves to the wants of the country. Why cannot they set apart, say, three years of their college course to be pursued by all students in common in the study of those branches which are of common use in all departments of learning, and then from that point permit their students, during the remainder of their course—lengthened, if need be, to five or six years—to pursue the subjects which are to bear especially upon their chosen callings in life? Let the men in this country, eminent in their departments, while they receive from these institutions a liberal support, devote themselves, by lectures, by personal supervision of studies, by aiding in scientific investigation, by directing to sources of information, to advancing the education of young men in their chosen fields of research. The students might be few at first, who were prepared to go on with these extended lines of education. Prof. Pierce thinks himself fortunate now if out of his large classes at Harvard College he gets one or two competent to avail themselves of higher mathematical education. But we must not expect large numbers in the higher walks of learning. Of necessity they must be few;—but let it not be the reproach that when God has sent a genius into the world, he should find the means of culture wanting, and the avenues of usefulness closed against him. Out of the millions of seeds which nature scatters over the earth, how few germinate,—fewer still reach their normal growth, and only here and there one in the ages which grows on through the centuries, like the cedars of Lebanon or the giant trees of the Yosemite valley.

There remains now but one point in regard to educational economy, to which I wish to direct attention, and that is included under the term consolidation. Consolidation is the great tendency of the day. Railroads consolidate to economize their expenses and increase their facilities for transportation. Churches consolidate to secure greater unity of action in their common work. Kingdoms consolidate for mutual protection and strength. Manufacturing companies consolidate to secure greater facilities for making and selling their wares. Why should not colleges consolidate? Is it not true that there is a great waste of material and intellectual resources by this multiplicity of educational organiza-

tions? Each of these numberless, feeble, half-sustained institutions must be provided with expensive buildings, and with libraries and apparatus. In each the departments of instruction must be filled by hard worked, badly paid men, who are compelled to include oftentimes subjects most diverse in the range of their teaching, and in so far are compelled to give inferior instruction. Every friend of good education will exclaim, what a want of economy, what a waste of educational opportunities! Suppose two or three of these feeble institutions should consolidate into one. At once the financial condition becomes one of strength instead of weakness. Superfluous buildings can be disposed of, and the requisite accommodations increased. A rearrangement of the departments will give to each man the special branch in which his strength can best be displayed, and thus secure the best instruction in each. New departments, extending beyond the possibilities of the present order of things, might be organized, which would furnish the facilities for higher education than is now attainable in our country. What an impulse, for instance, to sound learning would be given by the consolidation into one great university of all the colleges in the city of New York! What a magnificent provision could thus be made in the metropolis of the nation for an institution equal to the wants of the country, and worthy of its future greatness. Let the influence of this convocation, and the influence of all friends of good education, be given against multiplying the number of institutions of learning, and in favor of strengthening and consolidating those already founded. Let local and personal ambitions be subordinated to the more important interests of sound learning. The result will commend itself as true educational economy.

THE STUDY OF LATIN, WITHOUT REFERENCE  
TO PROPOSED LIBERAL OR PROFESSIONAL  
EDUCATION.

BY N. W. BENEDICT, A. M.,

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"The consideration of ideas and words as the great instruments of knowledge, makes no despicable part of their consideration, who would take a view of human knowledge in the whole extent of it. And, perhaps, if they were distinctly weighed and duly considered, they would afford us another sort of logic and critic than what we have been hitherto acquainted with."—*Locke*.

The study of the ancient classics, or at least, some knowledge of Latin, has generally been supposed to be a necessary auxiliary to a liberal education, and especially to the successful prosecution of a profession. The cultivation of the "humanities" that adorn social life, and elevate the mind to the perception, the contemplation and the enjoyment of "the true, the beautiful and the good," and beget aspirations for something higher and better than sensual enjoyment, or material success in life, has, ever since the so-called revival of learning, been directly or indirectly, the fruit of classical studies. From the same fountain issued what has sometimes been called the Baconian philosophy, which, by setting men's minds upon the right method of interrogating nature, has made her yield up those inestimable treasures of science, whereby not only the man of wealth may be a prince, but the masses of the people, living in obscurity and comparative poverty, may, and often do, possess a hundred fold more of the comforts, conveniences and luxuries of physical life than, only a few centuries ago, fell to the lot of crowned heads. In this sphere of study alone, was found the method of making a practical application of logic and metaphysics, whereby the very foundations of creeds and sects are thrown open to the inspection, not merely of the theorist, skeptic or psychologist, but of the plain, unlettered, honest lover of practical truth; and whereby the venerable beliefs of our fathers are brought before the bar of our own consciousness and conscience, and, while the timid have shuddered, expecting to see the overthrow of the

Christian religion, the enlightened lover of vital godliness has been thrilled with inexpressible joy at the demonstration that faith and reason are coincident, and that the strongest and surest faith is anchored in the deepest and best of reasoning.

To the same source is the Anglo-Saxon race indebted for that thorough examination of the principles of human liberty, the origin of governments and political systems, which originated juries and the British constitution, built a bulwark against the encroachments of the crown, and gave to the people such a taste of liberty as to make them the mightiest nation on the globe.

It is too little known that to John Milton, not only the greatest poet and finest classical scholar of his age, if not of any age or nation, but also the greatest and soundest statesman and political writer of his day, the world, and, in a special sense, the great republic, are indebted, for the searching out, and the embodiment in form, of those fundamental principles of birthright freedom, and equality of personal right, of an untrammelled conscience, a free church and a free press, which, when the people were ripe for self-government, furnished their leaders with a whole system of political rights and prerogatives in appropriate sentiment and fitting words, all ready at hand in the political essays of Cromwell's Latin Secretary of State, who, a hundred and fifty years before the birth of our declaration of independence, to the great disgust of kings and tyrants, wrote such words as these: "No man who knows aught, can be so stupid to deny that all men naturally were born free; being in the image and resemblance of God himself, &c." And from this "self-evident" truth he proceeds to show, in irresistible logic, that all governments must "derive their just powers from the consent of the governed," proceeding in such language as this: "It being thus manifest that the power of kings and magistrates is nothing else than what is only *derivative, transferred and committed to them, in trust, from the people to the common good of them all, in whom the power yet remains fundamentally, and cannot be taken from them without a violation of natural birth-right;*" and so on, for the utterance of which self-evident truths he was maligned and persecuted while living, and even stabbed in his reputation, when dead, by Dr. Johnson and the other liberty-haters who survived. But his propositions lived. Conveyed to a new continent, they grew with unwonted vigor, till, in the very cradle of liberty, like the hands of a young Hercules, they strangled the hydra of irresponsible power sent to crush and swallow

them, and now, in the young manhood of our nation, these same propositions of "John Milton, the old blind schoolmaster," have shaken the continent with an earthquake that has broken the shackles of every bondman, and made its vibrations felt on the other side of the globe, realizing to us the vision of this same poet, as seen by his prophetic eye more than two hundred years ago: "Methinks I see in my mind a noble and puissant nation rousing like a strong man after a sleep, and shaking her invincible locks: methinks I see her as an eagle, muing her mighty youth, and kindling her undazzled eyes at the full midday beam; purging her long abused sight at the fountain itself of heavenly radiance; while the whole noise of timorous and flocking birds, with those also that love the twilight, flutter about, amazed at what she means, and in their envious gabble would prognosticate a year of sects and schisms." And, as Milton modestly tells us at what classical fountains he had drunk in these inspirations which made his soul yearn for a better government and a higher political and religious condition than the world had ever seen, so in his letter on education, he tells us he would have the youth of the nation, after having their minds disciplined, and their souls fired by contact with the same master spirits of old, come "to the study of politics; to know the beginning, end, and reasons of political societies; that they may not, in a dangerous fit of the commonwealth, be such *poor, shaken, uncertain reeds, of such a tottering conscience* as many of our great counsellors have lately shown themselves, but *stedfast pillars* of state." If the working out to a demonstration, through blood and fire, of Milton's propositions concerning civil government and religious liberty has proved the heaven appointed means for the salvation of the church and the nation, would it not be reasonably safe to make a fair trial of his theory concerning the proper method of preparing the youth for the responsible duties of self-government?

But I can only thus, by a hasty generalization, barely shadow the indebtedness of the present age, for all its practical attainments in science, and for all its material prosperity, to those minds that have been either directly imbued with classical learning, or have been awakened and impelled by those that were thus instinct with the life of clear analysis and deep thinking. The fullest proof of all that is here implicitly claimed for this foundation of all sound learning, can be given in details which would far transcend the brief limits of this paper. The means of such proof



are contained in the dry statistics, gathered by the patient researches of such men as Professor Kilbourn, who, since the ungrateful efforts of some to depreciate the worth of classical studies, have accumulated such a mass of evidence as appears to be, in some departments, at least, almost exhaustive; showing that, hardly any real progress in the arts and sciences, and almost none at all in the professions, have ever had their *origin* independent of such studies. I trust that this mass of testimony may be printed for distribution.

I am not unaware, however, that by availing themselves of the facilities which classical studies have brought to the professions, some enterprising men, and some men of genius, have been enabled to enter, empirically, at once, upon a profession; using, and frequently with a good degree of practical discrimination, the gathered and assorted lore of those masters of the profession who had been classically trained, they have thus converted the profession itself, whether law, physic or divinity, into a lucrative *trade*; and then, with an ingratitude, which, unless ignorance be a just bar to conviction, is parricidal, have asserted their entire independence of the schools, and of the whole course of preliminary intellectual discipline which is born of thorough and proper classical study.

But, allowing classical studies to be a necessary coadjutor to liberal education and to professional life, for those, at least, who look upon a profession as something more than a mere *trade*, ought these studies to be confined within these narrow limits? Have common minds, that are to be trained merely for the ordinary pursuits of every day life, any need of classical learning? Do those taking merely an English or scientific course, need to study Latin? Such questions as these arise from two vitally fundamental errors, viz: The supposition that the design of education is to fit its recipient to achieve material success; and, secondly, that the object of studying Latin is simply to add the knowledge of another language, or to learn to read the language of the ancient Romans. I call these errors vital and fundamental because, in the first place, no course of study is true education, or any thing more than the learning of a trade, unless it is vitalized by some higher motive force than the dray-horse of material success. True education seeks the absolute perfection of man, corporeal and mental, intellectual and moral; and, while we know that this cannot be attained in our present sphere, the mind should be put upon the road that tends in that direction, and, so far as time, means and circumstances allow, be habituated to tread the upward path, with

high and holy motives, hopes, aims and ambitions. The young are to be educated, not because they are to take care of themselves, or do good in the world, but because they are human beings, because they are made in the image of their divine Author, because they have souls capable of endless approximation toward Omniscience, because the present life is the limit of their probation, in which narrow sphere they must achieve one success, and that belonging to their higher nature—to the mind, the soul—or their whole future existence will be an irretrievable failure. Were this not the case, were the common mass of the people to be trained simply to get a livelihood, whether by the sweat of the brow, or the fiery vigor of the brain, they would need to be, as many of them are, but machines, having their theories on science, on language, on law, politics and religion, made for them, in which they should place the same faith which was exercised in learning the names of the letters of the alphabet. They should attach themselves to the church and the party where they may get the most comforts and the best pay, for doing the work of those who think for them on all subjects worth thinking about. They might be the safe subjects of an empire, or of the Papal States, but should be intrusted with the ballot only when chained to the chariot wheels of their liege lord. They are not fitted to become the citizens of a free republic; for these must be capable of turning up the very soil with a plowshare that owns allegiance to the laws of logic, and of fighting with a bayonet that thinks.

As to the error involved in the supposition that Latin is studied merely to learn that language, and to read the authors who wrote in it, I reply briefly that the common objection to the study, based upon this assumption, is a valid one, viz: English scholars do not need to write or speak Latin. The English language, if any language on earth, is certainly competent to the wants, purposes and capacities of the most active minds, in all the relations of life, in this most stirring age. Those who frequently interlard their speech and composition with quotations from Latin, or any other foreign language, are generally of little account, and probably ignorant of the highest and best uses of their own vernacular. And, as to the reading of the wisdom of the ancients, treasured up in Latin and Greek authors, though there was a time when the most important and laborious duty of the universities was to preserve, copy and interpret these ancient records of learning, the invention of printing has made the universities of but little conse-

quence in this department, by multiplying copies of the originals, interpretations and expositions, till a college student may read any of these old authors through, without finding a difficult passage, or making the acquaintance of the originals, and so may any one else. The common people know all this, and their objection against so much labor for such an object is as well taken as was that against the method of carrying a grist to mill, said to have been in vogue among their forefathers.

“ Well, then, says one, why, ‘ in the name of all the gods at once,’ should students, not designed for a profession, study Latin ?” This question may be answered directly and pointedly, and even briefly, to those acquainted with the method of mental growth. It is a fundamental law of our being, unexceptional and irrevocable, that the mind grows, or obtains power—for the terms growth, expansion, faculties, &c., &c., when applied to the mind, are but blind, and often very deceptive, metaphors—only by the exercise of its own native or inborn energies, or, to state it differently, the mind never gains power except through the exercise of putting forth power. Try the experiment ; begin with the youngest mind: it has but little power ; call it out, it has gained, perhaps, as much more ; continue the process : if it reach a point where it cannot put forth any more, where you cannot evoke any more, its growth or increase of power stops at that point. If this self-exertion cease in infancy, we say the mind is idiotic, if a little farther on, semi-idiotic, &c. ; if it lack the ability of self-exertion in a certain direction, we call this a natural defect, or want of a faculty. *e. g.* It is said that George Combe could not learn the multiplication table by seven years’ study. It is also a law of this law that the maximum of mental energy is in the discovery of a new truth (*i. e.*, new to the mind that discovers it), the minimum in the receiving of knowledge from others. The child is vastly more pleased with the finding of an object, unaided, than by having that object found for it, because the greater mental energy always affords the more pleasurable emotion. Hence every true system of education is based upon some plan of setting the young mind upon a course of discovering truth. All that can be given to the young, in this way, should be given in no other. It would be a dull and wasteful employment of the mind to commit to memory the propositions of Euclid—just as useless to commit the demonstrations : to prove to one’s own consciousness the truth of the demonstrations, would be much nearer to the discovery of a new

truth ; but, if a part or the whole of a demonstration were to be discovered by the pupil himself, to one equal to the task, the process would afford an exquisite happiness akin to that felt by the Greek who immortalized the word *Εὐρηκα*. This is the reason why some new application of a known principle has made its originator mechanica genius, in some instances almost beside himself, and living in a region of light and beauty unknown to all save himself. This it was, that, in the providence of God, made Galileo and Sir Isaac Newton great. It is this principle, and this alone, that has made every real student that ever lived. How, then, shall this law be made operative to the best advantage, and to the greatest good of all, or nearly all, classes of mind ? Simply by proceeding to deal with minds according to the demands of the law. The world has been astonished to see what even the infantile mind is capable of doing, in the way of self exertion, when led by this method, as directed by Pestalozzi. But the process should not stop, nor should the method be dropped, with infancy. When the mind is sufficiently taught to put forth its energies upon objects of sense, it should come at once to the study of language. It should be taught to put forth its power upon words, to see how they are made, for what they are made, what truths they contain, how these truths are to be discovered, what relation they have to ideas and so on into metaphor, science, ethics, metaphysics, etc., etc. And what language is the best fitted to call out the energies of the young mind ? No doubt its own vernacular, its mother tongue. It will here get its vocabulary, while exercising its powers in naming objects and describing their properties. But the mind is not always to be concerned with this class of words so easily and rapidly laid up in the memory as names and attributes, and actions that can be seen. Consciousness soon asserts its power, and the mind begins to *introspect*. It turns over the treasures laid up—makes new, beautiful or grotesque combinations. The *moral* sense demands a new set of terms, new names, new attributes : a new world supervenes. Its wants must be met, or the young mind soon tires of that on which it can exert only the power of an infant. Even in the study of science, it has terms which it cannot handle with the same satisfaction it felt in the name of a visible object. What must be done ? It has not been accustomed, if rightly taught thus far, to grasp words and hold them by mere force of memory, when it can get no hook upon them, nor any mark to identify them.

Shall it proceed to learn these by the "help" (?) of a dictionary, or by such definitions of them as are given in each science in which they occur? Horrible! Is this process of learning the English language one of the methods of science? or, does it contravene both the science of language and the laws of the mind? Apply this method, if chaos can be called methodical, to the study of any other science. What should we think of a work on botany that should propose to take up the whole vegetable kingdom, plant by plant, without any other classification than an alphabetical list, containing a separate description for each, till more than two hundred thousand individuals were exhausted. How long would it take the student to master, say, fifty thousand by this method? And, if his memory had accomplished even one-quarter of such a task, would his mind be able, after this, to put forth any power? I think not. And yet, it is neither caricature nor exaggeration to say that those who are expecting a pupil to become acquainted with his native language so as to be competent to its use in works of literature and science, without the aid of Latin or Greek, are vainly expecting him to do vastly more, precisely according to this impractical and barbarous method; for they set him to the task of learning the terms of literature and science, one by one, as so many independent, or detached, arbitrary symbols, which often seem to mean one thing in one science, and a very different thing in another, and to have, perhaps, in common language, an application entirely at variance with both—witness, *attribute, essence, essential, subject, denomination, Gentile, factor*, and so on, *ad libitum*—and they expect him to do all this, simply by force of memory, without the aid of classification or science; and suppose an earnest pupil to have accomplished this, in respect to a great number of words, say the terms used in so many sciences as he has "gone over," what is he to do with the almost numberless shades of thought which these same words, and many others in general use, may be made happily and forcibly to express under the manipulation of a skillful writer who had the seeds of words sown in his soul when he studied the classics in boyhood?

It is necessary here to revert to the law of mental growth and ask what a weakening process is it for the mind thus to be set to learning the meaning of words by being told what they mean, instead of being furnished with the materials and allowed the gratification of using the higher mental energy required to discover to his own consciousness just what they mean and why? Here it

will be suggested at once, that we have the whole system and true method of learning our language set forth in our spelling books, with Latin and Greek prefixes and suffixes, and in etymological class books. What more is wanting? To this I say, firstly, that this process but affords the less mental exertion. The facts and laws are to be committed, and but very little chance is given to the student to make the discovery of truth for himself. This method of studying the English is infinitely better than the old process, because it proceeds on the principle of classification, but it lacks the stimulus of the greater and more pleasurable emotion of exercising the greater energy employed in discovery. Some thirty years since, Salem Town, taking the hint from an old author who had made a similar experiment, set the public mind on fire by the publication of his new plan of learning the English language by the Latin and Greek radicals found in its words. This directed the attention of many teachers to this excellent method, and much good was done, even to those who did not become classical scholars. Town's Speller and Analysis were popular, and other scholars, falling upon the same treasure that had been so useful in the hands of Dr. T., published other works; and there are excellent etymological text-books, such as Oswald's, Lynd's, &c.,—the last named being very superior, and yet, in many places, not known, and, perhaps, nearly or quite out of print; and why is this method apparently almost falling into disuse? Because all these books are of vastly greater service to those who have a knowledge of Latin or Greek, or both; inasmuch as to such, they are suggestive, and set them upon the right track to a fruitful field of discovery. Every Latin scholar should possess such a work as Oswald's Etymological Dictionary, or Lynd's Etymological Class Book. But a few months' study of the English language, by going directly to the learning of Latin inflexions, parsing, and analysis of Latin words, is, in every instance, when properly conducted, vastly more productive of a thorough knowledge of English words, and of a healthy stimulus to mental energy, than the labor for the same number of years, devoted to the careful study of the best etymological works, under the guidance of the best instructor, unaided by the direct study of Latin. And again, a teacher ignorant of Latin or Greek, is almost wholly incapacitated for giving instruction by means of etymological text-books, being entirely without any means of originality, or of verifying the dicta of the author, or of teaching more deeply than the bare

text, and consequently incapable of driving the didactic machinery by that higher force of original thinking generated by discovery, and without which any teacher, in whatever department, must soon "run down."

The only possibly successful method, then, of learning the English language, is to study it first by means of the learned languages, whence it derives almost every word in its scientific, literary and metaphorical (or figurative) vocabulary, besides a vast number of the terms in common use by the common mass of minds of ordinary intelligence, whether classically educated or not, which terms the shrewdest and best practical men, unless they have learned them by the means indicated, are liable to misspell and misemploy, so as often to bring upon themselves great mortification, and lead the most modest, thoughtful and deserving to distrust their own ability to express their opinions publicly, often when their own interests or those of society imperatively demand that they should do so; and to induce the less scrupulous to seek posts of honor and emolument, by appearing in hired plumage, to claim the homage which they know to be unmerited. What does our nation lose, of moral worth and tried integrity, from this source alone? What would have been the feelings of a veteran editor of an influential city paper of great age and wide circulation, if some one could have shown him his exact position in the literary circle in which "he moved with pomp and circumstance," when, after having given a sarcastic thrust at the stupidity of studying the "dead languages," (as he supposed them to be,) he described, in florid rhetoric, a new railroad *round-house*, characterizing it as an *octagon* of *sixteen sides*! or of that medical man of extensive city practice, who, after saying that *he* "had never yet found the need of more than one language," alluded to one of his patients as having a "*hepatic* affection of the *liver*!" Both these instances came under my own observation, and enough more, had I taken pains to record them, to make a sizable book, the honor of whose parentage ought not to be given to Mrs. Partington, when there are so many distinguished "matrons of the male sex" who have shown themselves fully competent to utter *facetiae* of this kind, without even a consciousness of their eminent qualifications in this line.

Not to pursue this part of the subject further, but to state briefly the method in which the English language should be studied, and a portion of it mastered, before any of the sciences

are taken up by their text books, some brief compend of Latin grammar should be used containing all the Latin inflexions, and sufficient explanations to enable the young pupil to learn them, not by the ancient process of memorizing all the words, but by learning a few terminations and the method of finding the root, and the process of annexing this to the significant endings, till he is capable of discovering for himself the method of procedure with any word. Then let him begin to parse and analyze verbs, giving, at least, the first and third roots, with a single meaning attached, and find for himself so many English derivatives as he is able, and discover what relation each has to the root both by orthography and signification. After a little, give him English words promiscuously, if possible (unless he is too young), such as he has never seen or heard, but such as are current with those who write the plain Anglo-Saxon in its purity, and such as are derived from the root of the words which he has already parsed, analyzed, and used to form derivatives, and require him to give their *etymon*, i. e., their *radical* or *root-meaning*. As the process goes on, he will be surprised and delighted to find that he had been using Latin words daily to express his own ideas, even when he did not know what his words meant; and he will now begin to learn the art of verbal criticism by correcting himself and others. E. g., he will say, "I never before knew the difference between an *audience* and a *congregation*. There would very likely be a *congregation* in every *audience*, but not *vice versa*; for when M. De Lave walked his rope, at the Falls, there was only a *congregation*." He is learning to think now more correctly, more rapidly, and more profoundly, than ever before; for there is not a new word that comes to him thus, on which he does not put forth such power as begets some pleasure, and often that which is very intense. Care must be taken, or he will over exert himself from the great delight he finds in a study conducted thus. He feels that he does the work himself, and often becomes impatient of assistance. He wishes to see the new land *first*, and be the first to set his foot on shore. The "blurred metaphor" of the English dictionary, on which he once looked with so much awe, is beginning to lose its reverence in his estimation, for he is getting behind the scene and discovering of what materials it is composed; and sometimes he finds that, in its definitions, very weak broth has been made from very strong meat. Let him proceed in this manner, for all science is *correlated* truth, so that, while this,



method is the only true one for learning the English language, it is also the only proper one by which to prepare to read the Latin language, so that while there is no reading of Latin probably, the first year, but the whole time is spent in the parsing, analysis and etymon of Latin words, for the grand purpose of learning the English language in its purity, simplicity, richness, and unlimited capacity and flexibility, should any member of a class thus taught, begin to read Latin, the second year, he would, by its close, easily outstrip all who had spent the first year in learning to read by the ordinary process, while the latter would probably have derived no help toward becoming acquainted with their mother tongue. And here, I suppose, is the whole cause of the odium cast upon the study of Latin by the common people, when, if none but the true method of studying Latin were pursued, I do not believe there is power enough in any board of education, or body of trustees, to keep this branch of study, or this method of learning the English language, out of the common schools. [If this be not so, why is it that many and many a parent has come to me and said, "I did not want my son [or daughter] to study Latin, but if you will only take him under your care, and impart to him that desire to study *anything whatever*, that you have given to my neighbor's boy, who was once just like mine, you may put him into Latin, Greek, or Hebrew—anything that will make him love study and attend to his books—anything that will, in time, make a man of him, for I fear he will be a boy always."]

Many questions arise here, which, had I time, I should be most happy to answer, one or two of which I can hardly forbear to mention, viz : How early may this method of studying English be profitably commenced ? and is not a previous knowledge of English Grammar necessary ? To the first inquiry I reply that the same discretion should be used as in other departments of instruction, while we should bear in mind that, for other branches, the young very early discover a facility and fondness of acquisition, or either a natural incapacity which leads to aversion or a decided preference which secures marked success ; and we should first determine whether the lack, or failure, be in the pupil or in the *method* ; for instance, some, like the writer, are wholly incapacitated by nature for acquiring, under the most favorable circumstances, the first rudiments of music ; others, like a mathematical Professor of the writer's acquaintance, can never be taught the distinction of colors ; and others, again, are like George Combe, above mentioned,

who, after studying mathematics seven years, could not master the multiplication table. But language, being the vehicle and instrument of thought, the grand distinction between man and the inferior animal creation, the only medium for the discovery, preservation and propagation of any knowledge, science or art whatever, and the only one by which any instruction can be communicated, or any mental discipline secured, no human beings, capable of any intellectual culture, can be so constituted as to be naturally incapacitated for the acquisition of language. One language is learned by children with as much apparent ease as another. I have known a little prattler to learn Latin, Greek and English at the same time, each of which formed his first articulate utterances *pari passu*, and hence, with a proper *method*, the age at which Latin may be commenced is not material; but, as I have already suggested, the study of English *word-building*, and practical English orthography and *etymon* of the metaphorical and scientific words of our language, should be introduced as a study into the schools for pupils who have already made good progress by means of the Pestalozzian system of learning the use of those common words which are first learned and first employed by children, as expressive of objects of sense and the actions allied; but, by all means, before they come to the study of any of the sciences. Hence, in the system of object teaching, so called, I would throw out the Latin and Greek roots, except where they occur in short words as descriptive terms of familiar objects. I consider it as an absurd and pernicious waste of time to carry the young mind through the terms of the arts and sciences, which terms, however familiar he may become with them, must ever be barbarous until he comes upon them by the natural, scientific, easy and delightful method of *discovery* which I have pointed out. Let him be told that "*in-com-bus-ti-bil-i-ty*" means "that which cannot be burned," and a hundred other similar things about words of this kind, that his young vocal organs can scarcely yet utter, syllable by syllable, and, though he may credit the assertion, and be proud that he can repeat the definitions of so many long compounds, he has *learned* nothing; he has been *taught* nothing by this process of committing the *dicta* of his books and his teacher; but let him learn, at the proper time, and by the true method, that the root *ur, ust*, means *burn*; and that, from these few letters, as a seed, or bulb, grows up a fruitful tree: let him be taught to plant such a seed and rear the tree himself, and then he has put forth power and gained more

than as much additional force. When he has once learned to sow and reap in this manner, if he is told that "*asbestos* means *incombustible*," he will ask *how*, or *why* does it have such a signification? and if he cannot find it in his Latin roots, he may, sometime, learn that its Greek root has nothing to do with *caustic*, burning, but is concerned with *putting out* the burning; and that he has been *deceived* by the definition; that *asbestos* never meant and never can mean anything but *inextinguishable*; and then he will be anxious to know *why* it was applied to a *stone* which will not burn at all. In time he will continue the search, will ascertain that this mineral was at first called the "*Cyprian stone*," from the place of its discovery; that it was a great desideratum [*desidero, desiderium*, a feeling of *want* or *lack*, sometimes called *desire*] among the ancients to find a lamp whose wick would not *char*, or turn to *carbon*, for such a lamp would never go out, so long as supplied with oil, and could be left in a tomb or a temple for any length of time, with an assurance that it would continue to give light so long as its fountain of oil continued to flow at a given rate; and that a certain Greek—the *proto*-type of the Yankee—made a *lamp-wick*, of Cyprian stone, which would not *char*, and called it *asbestos*, or *in-ex-tinguish-able*; and that this finally gave a permanent name to the stone itself. In this illustration I have made use of an actual occurrence which came under my own observation; and must let this one serve in lieu of similar incidents enough to fill a volume, all going to show with what avidity pupils will study a science by the true method, how many of the correlated truths of other sciences they will learn while pursuing a single branch, and how rapidly and how *healthily* the mind *grows by its inherent energies* (*inworkings*), by such a method. I have reason to believe that an eminent geologist owes his introduction to his favorite science and his true inspiration or love for it, to this method of studying the English language.

It will hardly be necessary now to say, in answer to the question about taking this branch of study before learning English grammar, that this method should be commenced before the pupil has sufficient maturity of mind to understand the philosophy of language, or to comprehend, with any success, the intricacies of syntactical relations, both of which belong to the very foundations of English grammar, and no one should take up this branch while its whole nomenclature would be to him a barbarous language, each term of which must be grasped, as given in the definition,

and held by mere force of memory. Who ever learned the true force of the subjunctive mood till he learned the *etymon* of *sub* and *junct*, so as to be able to feel their *power*? As to how long this study is to be continued thus, I need only say, that the longer time any one can enjoy an exercise so delightful and so practically useful to every young mind, in a great many ways which I have not space here even to suggest, the better. After the first year, in the majority of cases, and before that time in many, the mind of the student thus trained, will have acquired so much more ready available mental power, and so much greater facility to learn, that he will do more work and do it better, in any branch of science or literature, besides continuing his Latin, than can be done by any one of equal capacity in the outset, who has not had this kind of training in the words of the English language. This has been repeatedly tried, and it is the universal testimony of academies and colleges in which public odium against classical education has established a "scientific course" (so-called), that classical students will carry all that is put upon the "scientifics," and with better ability and with more effectiveness, and take Greek and Latin at the same time. If there are any exceptions to this, they have escaped my knowledge, after many years of experience, and much inquiry.

I must omit to speak of the wonderful facility given to English composition by the study of Latin thus pursued, and to show how the ability to compose is increased when translation begins, and to call attention to the great deficiency of eminent men in this respect, who have been thoroughly trained at military or other schools where the classics are ignored, and who, perhaps, by real mental worth, have risen to the summit of earthly fame and cannot make a speech or write a letter. But, perhaps, I ought not to omit to speak of a deception often practiced upon the masses and sometimes by men who should be ashamed to be thus contributing to mislead. It is often said that classical words constitute a very small portion of the English language, and from this an attempt is made to assign to the study of the classics a proportionate inferiority. It is an irrefutable answer to any such insinuation to state the simple facts. First, all our books in every art and science would be entirely destitute of any language in which to express its truths, if deprived of their classic-born nomenclature. I have not room to illustrate—let any one try the experiment. Begin with English grammar, or any other branch of study, and see

what this pompous falsehood makes for an argument against classical studies. Secondly, our language will not grow and bear fruit from its native stock. Try this. I cannot give a whole volume of illustrations here, but one could very quickly be gathered. Thirdly, the new words introduced into our language so readily and so beneficially of late, which are often so expressive, come nearly all from Latin and Greek roots, and how are we to know these, unless we know the root whence they came? Fourthly, what sort of an argument is that based upon mere *numbers*, where the particles, which connect words expressive of thought, have as many votes as those by which we think. E. g., suppose I say, "*I did not design to be sarcastic*," five-sevenths or upwards of seventy *per cent.* Anglo-Saxon, and but two-sevenths, or less than twenty-nine *per cent.* of classic, says the industrious counter; but throw out the classic element, dismiss all the natives but the negative particle, and what is left? No *intended sarcasm*, the whole idea more tersely expressed. Let any one pursue this experiment *ad libitum*. I might go on, if time would permit, up to twenty-fifthly, but I will close by a single question, followed by an illustration. Are men of learning who put this as an objection to classic study as an absolute necessity for English scholars, serious in what they say? Let me earnestly disclaim any intention to say that they are not; nay, even go so far as to say that I believe that the ablest and best of them *think that they are so*. But it will certainly be fair to take an illustration from an author who, as a scholar and popular lecturer in this department, stands, in many respects, at least, at the head of those who have brought this subject to notice on this continent; and certainly he, if any one, is capable of writing the English language in its purity and perfection "with good Anglo-Saxon words," unmixed, and free from the meretricious and tawdry adornment of foreign classic terms. I will, therefore, quote a single sentence bearing directly upon this question from Marsh's Lectures on the English Language, page 86, in which the italicized words which occur are to be particularly noted, both as to their force and *fittingness*, both to express, and to *illustrate*, the sentiments and logic of the gifted writer.

"Further *study* would teach him that he had over-rated the *importance* and *relative* amount of the *foreign ingredients*, that many of our seemingly *insignificant* and *barbarous consonantal monosyllables* are *pregnant* with the mightiest thoughts, and alive

with the deepest feeling ; that the *language* of the *purposes* and the *affections*, of the will and of the heart, is *genuine English-born*, that the *dialect* of the *market* and the *fireside* is *Anglo-Saxon* ; that the *vocabulary* of the most *impressive* and *effective pulpit orators* has been almost wholly drawn from the same *pure source* ; that the *advocate* who would *convince* the *technical judge*, or *dazzle* and *confuse* the *jury*, speaks *Latin* ; while he who would touch the better *sensibilities* of his *audience*, or rouse the *multitude* to *vigorous action*, chooses his words from the *native speech* of our *ancient father-land* ; that the *domestic tongue* is the *language* of *passion* and *persuasion*, the *foreign* of *authority*, or *rhetoric* and *debate* ; that we may not only frame *single sentences*, but speak for *hours*, [of course write as well] without *employing a single imported word* ; and, *finally*, that we *possess* the *entire volume* of *divine revelation*, in the truest, *clearest*, *aptest form* in which *human ingenuity* has made it *accessible* to *modern man*, and yet with a *vocabulary*, wherein saving *proper names* and *terms*, not in their *nature translatable*, scarce seven words in the hundred are *derived* from any *foreign source*."

About seventy-five words borrowed from a "*foreign source*," to help our mother tongue, say that they were not needed for this or any other purpose by any English speaker or writer ! One word in regard to what is said of the "*volume of inspiration*"—(Bible). By counting, Mr. Marsh tells us, that this book is found to contain but seven *per cent.* of foreign words ; but he did not tell us that 35,563 of these words are repetitions of the word *and*, nor how many times we should find *of*, *the*, *in*, *for*, etc., etc., nor what is the *relative value* of the untranslatable words to which he refers : e. g., such as the Greek *Apostle*, *Christ*, *Deacon*, *idol*, *plague*, etc., or the Latin, *divine*, *conscience*, *grace*, *Mediator*, *Redeemer*, *Prince*, *glory*, *punishment*, *eternal*, *repentance*, *patience*, *experience*, *doctrine*, *resurrection*, *prevent*, etc., etc.



## LITERARY EXERCISES IN ACADEMIES.

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Some of us may possibly remember when we were boys just entering for the first time, the threshold of the academy, or other high school, and possibly we may remember how inexperienced, jolly green we were in those more or less distant days. We can call to mind too, having just laid aside the implements of the farm or the work-shop, in what regal splendor the grounds and buildings were spread before our excited admiring gaze; how unwillingly we were made to know that mud and filth were the necessary accompaniments of rain and sour weather, in those enchanted regions, with what a thrill of joy we beheld, for the first time, the good, the noble preceptor and preceptress, their countenances beaming mildly and benignantly upon us, as though in us they saw the future greatness of our country. It is barely possible that we read their countenances wrong, or that those personages have slightly degenerated since that period.

Then came the study and recitations; and if heaven has given us the power to see ourselves as others saw us at that time, we can recall our awkwardness before the class, how wide we did shoot from the mark in spite of our grandest efforts, the sly snicker of our mates, and the quiet encouraging word from the teacher, till at last confidence and strength came slowly to our aid. Before many days, however, with some trepidation and a little secret pride, we heard our names announced among others, to furnish an essay for the following Wednesday. We had never in our whole lives, perhaps, composed a line, but in the confidence of untried strength, we felt that we could move the mountains, and melt the hills to tears. Lo! what a signal failure was ours. With pen in hand for hours we sat. Thoughts eluded us like shadows of fleecy clouds over the far-reaching prairie. As futile were our efforts as the grasp of the child for the stars. Weariness and sleep overcame us. The time drew near. The kind, good preceptor gave us another week. How we would in that time accomplish the great work. At length the meager production



was completed. How carefully we folded it from the sight of every intruder. Shame and pride wrought our self-consciousness to a high degree. The whole world knew of our effort, but its judgment should not be rashly summoned. It was too sacred for vulgar eyes. Our first sweetheart alone should peruse its hallowed page, for there were only about eight lines. And she said it was so nice, so full of good thoughts, that we gave it over to the teacher with ill-concealed satisfaction. At length it passed the ordeal and was returned. But, oh! how defaced! how marred! With hurried hand he had written in the margin, "Be careful about blots, *nine* are too many for one short essay. Your attention is called to the first sentence, viz: 'Spring is the most pleasantest time of the year.'—Grammatical error, etc. Again, the last sentence but one, 'The ox is a *nobul animi*.'—The words underscored are misspelled, etc., etc." How impotent was language to express our disgust with ourselves, our rage with the teacher. And when we thought to retrieve our good name at declamation, we stumbled and fell headlong upon the rostrum. Alas! the mishap closed our utterance, but opened the fountains of our tears. Kindly the teacher excused us from so embarrassing a position, saying, perhaps, that we had a good voice and manner, and would do well another time.

To-day even, notwithstanding the great improvements in our schools, literary exercises in our academies are a serious, dreaded business to many of the students, and an unwelcome task to some instructors. The burden is thrown upon the pupil without any preparation, and hence he flounders about, as in thick darkness. Young persons, almost men and women in stature and years, often enter the academy, who have never attempted an essay, or even a letter scarcely, having what is called a good common school education, and who firmly believe that the duties known as literary exercises, are all stuff and nonsense. They are without sufficient knowledge and experience with the world to appreciate their use in practical life. Their aspirations do not lie in that direction. Pride and ignorance tend to stimulate opposition to, and even revolt against, these meaningless exercises. This state of things on the part of the student, will sometimes beget indifference and neglect with the class officer. Is it strange, therefore, that students do often complete the academic curriculum, and enter upon the college course, or go out into the world, without being able to

express their thoughts upon paper, or even to utter them with any degree of ease or accuracy?

It is proposed in this paper to remark briefly upon the object of literary exercises in our academies, and the means which may be employed to accomplish the object; and in the first place it may be stated, that the aim should not be to make great writers or speakers of the students. Such a mark is too high for them. Instead of kindling the ambition of the learner, it will, in many cases, prove a lasting discouragement. The gulf is too wide for him. He cannot overleap it. Continents and oceans lie between him and the end to be gained. And in the event of rapid growth, he will be too apt to fancy that he is nearing the goal, and slacken his efforts accordingly. Rather let the facts appear before him in real living colors. Let him understand that he is to learn to utter his own, or the thoughts of another, with freedom and force, in the presence of any audience, upon the street, before a knot of neighbors, or upon the rostrum or the stump, to the assembled multitude. Let him be taught also that the pen of the ready writer is plumed for its mission only by patient, careful thought and research. No flimsy rhapsody, no wild unstudied statement can ever avail to move, or arouse in the right direction the intelligence and coöperation of good citizens. As in the ordinary walks of life, experience gives strength and vigor, and in the various professions, long-continued effort and practice make men valuable, so in this little matter must the student be trained to patient persevering labor, reviewing his work from time to time, writing and rewriting his argument, until it shall assume proportions and a state of perfection satisfactory to his best understanding.

An object of importance to be gained by the student in these exercises is confidence in his own opinions and views; such assurance as will enable him to meet opposing statements without shrinking, and to weigh them with candor. At the outset, the learner will very likely have too much pride to give an unbiased expression to his thoughts. The most common-place topics will assume in his mind an unnatural importance. Every blow aimed at his argument will be sure to hit him, and writhing under the pain inflicted, he will strike wildly about, without plan or purpose. This excessive self-consciousness must be toned down, until he is enabled to see things and estimate thoughts objectively—a hard lesson for many to learn, but valuable as any event in the life of the student.

It should be distinctly understood and impressed upon the mind that these exercises have a direct bearing upon every day practical life. Time is seldom wasted in studying the use of language. As a medium of communication between man and man, a vehicle for the expression of thought and emotion, it has all the varieties from the old go-cart that travels the road over so thoroughly, to the superb turn-out gliding through the streets of our cities ; from Jonathan or Teddy on the witness' stand describing the last night's broil, to the elegant periods of an eminent divine, or the telling words of a distinguished jurist. And it becomes the imperative duty of the student to avoid speaking or writing at random, to become acquainted with and to use the best forms of expression, to talk his best in conversation, as he has learned to write in a style the most approved and acceptable. The interests of education demand that our youth should be early instructed in the development of their conversational powers, to use the right word in the right place, to employ fewer terms with more meaning, to become more studied in expression and less emotional. Without these attainments we cannot become an educated people in the best signification of the term. And it seems to me that these exercises constitute the beginning of this culture. It may be said, and the argument may be good, that these constant efforts at precision and elegance would deprive our language of its bloom and fragrance ; and yet we are apt to extol the Greek and Latin for these very qualities.

There are several specialties that may be noticed, and they should be carefully watched in conducting the exercises in composition writing. The first I name is the mechanical execution of the work. It will possibly answer for lawyers to draw legal papers in such a manner that nobody can read them, not even themselves on the following day ; it may do, perhaps, for doctors to make prescriptions in hieroglyphics, but the young learner should be given to understand, that there is beauty as well as utility in a fair, legible handwriting, a neat, clear page, and evenly arranged margins. It is true that slovenliness and other irregularities are sometimes attendants upon genius ; but they should always be set down as faults more or less injurious, and not even dignified as doubtful virtues. They are the legitimate marks of ill-breeding, loose training, bad taste, and not unfrequently they proclaim dissolute habits. Neatness and order are grand essentials for the young person preparing for the duties of a business career.

And in these essentials I would have the student trained with special care, even to the filing of a paper passing through his hands. It has happened that students in college, and business men were entirely ignorant of the fact that one way was preferable to another for folding and filing a written document. But aside from its practical bearing, as a matter of general culture, the subject demands careful attention from the instructor.

Many young men and women entering upon a course of instruction in our academies are lamentably poor spellers, and indeed the same is true of a large class of the community. The pastor of a church addresses the teacher of his son as *principle* of the academy. A presiding elder, writing to the superintendent of an institution, mentions the ill *helth* of his daughter. A graduate of college writes to his friend that he has at last *concented* to accept the principalship of a certain flourishing academy. A young man, educated at an academy, and now in business, writes that he has more business than he can "ten to," meaning, attend to. A gentleman resided in New England, the land of schools and scholars, spells Chautauqua, shar-talk way, and this upon the envelop of a letter. Instances might be multiplied indefinitely in which the native American English is murdered by wholesale in its very infancy. I venture the opinion, however, that it is not a matter of surprise that the orthography of our language should be so indifferent among persons more or less educated. To a foreigner, a novice in the use of English words, the letters, as has been aptly remarked, seem to have been tossed into a hat, well shaken, and then drawn, without sight, arranged in rows, terminating the words at convenient points. Indeed, our best authors of school spellers have been unable to so systematize the rules for the orthography of the language, as to enable the learner to acquire it with any degree of readiness. To write words with accuracy requires constant diligent attention to the words themselves, and generally in connection with their meaning. A life-long pursuit is orthography, and the instructor in the academy should not ignore the fact. However satisfactory the previous training of the pupil may have been, the essay must be guarded against the errors of false orthography.

Nor of less importance is the construction of the sentence, the right use of words and their collocation therein. Grammar as an art is, or should be, taught to the child early in life, when lisping its little evening prayer, or prattling with its mates upon the

street. It is often, however, neglected, and the greater part of the work of accomplishing it must be performed in the academy. If rapid progress is to be made, every exercise should be caused to assume the importance of a written essay. Let the pupil write the sentence he utters, and see for himself if it will stand the test of good usage. Various means may be employed, any of which will do excellent service, if it do but make every uttered thought of the student to stand out like an instrument of record, for reference and inspection.

Thought is an essential element in the essay of the student, as well as in the writings of other people. Alas ! for the production that has a lack of ideas. In reality they constitute the warp and woof of the intellectual fabric. Words and sentences are but the media, and no matter how elegantly drawn or fine sounding they may be, they can in no sense take the place of the thought. These statements are made simply as matters to be kept constantly before the mind of the learner. Much might, but surely little need be said in regard to literary culture, as a necessary basis for these exercises. There must be a fountain, and the more perfect it is the greater and purer will be the supply. Observation, reading, careful study and much reflection are the chief sources, and to them the earnest, considerate instructor will constantly direct the attention of the student.

The means that may be employed to secure the growth of the student in his literary duties are various, too numerous to be mentioned even by name in this paper. Each instructor will have a method of his own, modified, of course, by comparison with others, and his own way will be the best instrument in his hands for securing the object in view. In the working out of any plan, there should always be a wise reference to the specialties already named, as well as to others of equal importance, perhaps, not mentioned. But the labor of the instructor in the academy is materially relieved and advanced in proportion as the pupil has been well trained at home, in the primary and the grammar school. How much more satisfactory will be the advancement of the student if as a child he has all along been well instructed in orthography, object lessons, dictation exercises and impromptu composition. If this early training has been neglected, he should, to a certain extent, begin at the foundation, when he enters the academy.

A few words may be offered with regard to a definite plan for

conducting literary exercises. I choose the following. Having divided the school into as many rhetorical classes as are required, assign each class to a teacher, who is to become responsible for the performance of the duties in his class as class-officer. Each class is then divided into three sections. The first week of the term, the members of section A will write essays, which will be assigned to different members of the same section for criticism. Section B will declaim. Section C will rest. The second week, section A will criticise the essays assigned them the first week. Section B will present essays to be assigned as before to the members of that section, and section C will give declamations, and thus continue the programme through the term. The essays and criticisms should, in every instance, be read by the author before the class. This method gives each student a duty to perform every week, while the change from one duty to another adds to the interest and life that should always attend these performances. The method of criticism by the student may be regarded as a chief excellence in this system. The person criticised is kept continually on the alert for faults in his own work, and cheered with the hope that if he receives a blow he will be permitted to repay in kind when his turn comes; while the critic, having the specialties previously named, viz : mechanical execution, orthography, etc., as a basis and guide in his review, receives like inducements to do his work well. If the latter does not perform his duty satisfactorily, the essay should be returned to him for review the coming week, or if the person criticised feels himself aggrieved, he may have the opportunity of replying, correcting the critic, and defending himself. All these exercises should, of course, pass under the immediate supervision and direction of the class-officer, and before the term has advanced many weeks, the students will be found earnestly engaged, devoting all their spare time to the work of preparation. A word in regard to declamation. The term is rather unfortunate. Without explanation it may and often does signify to the beginner loud and boisterous talk, ranting, and contortion of the limbs and body; but rightly understood it has reference to conversation properly carried on in the parlor or upon the street, the statement of more important truths and arguments in the presence of a select or miscellaneous audience, and it may sometimes rise to the utterance of pleasant or painful emotions, or towering vehement passion. With this view let a piece or passage be selected and well committed, the meaning of

the author and his surroundings fully explained by the teacher. The learner is then prepared to make the sentiment his own; but before his appearance in the presence of the class, he should always have the benefit of a private rehearsal, the advantages of which are too evident to need a remark. At the close of the class exercises, the school may be summoned together, and selections heard from the performances of the previous week. The best ones being selected, they will have the advantage of fair examples, and be inspired to a more faithful execution of the duties assigned to them.

All these things properly attended to, say my hearers, will require a large amount of time, more than is customary, and, perhaps, allowable. Very well, let the hours be so taken, even to an entire day. The object to be gained is well worthy the time and effort. By these exercises the students are taught to think and reflect, to make record of their best thoughts and reflections, and to utter them in a becoming manner. They are the culminating point to which most of the school duties, in study and recitation, disciplinary and developing, are directed. Through these exercises the student reaches the manhood of his education. Therefore one-fifth of each week is not too much, if indeed so much time be needful, to carry forward, wisely and advantageously, the literary exercises in our academies.

In conducting the exercises, but one distinction need be made in behalf of the ladies of the class. They may be allowed to read an extract instead of committing and reciting it. I see no reason for further qualifying the training of the girls and young women attending the academy. But this is not the time to argue the question.

The plan already stated—if I may be allowed to refer to my own experience—has been adopted in the institutions with which I have been connected, for several years, with satisfactory results. Indeed, it has never failed to develop a condition of things highly gratifying to the instructors. Much trying labor is a necessary attendant, but the sower of the good seed may also reap an abundant harvest in the growth and development of his students.

## HOW TO READ.

BY ALDEN B. WHIPPLE, A. M.

*Principal of Lansingburgh Academy.*

Gentlemen—A brief essay on a method of learning to read may not be inappropriate before the members of this Convocation.

If we look into the Report of the Regents, we shall find a number of academies in which are reported "no classes in reading;" many academies in which, during the week, a class is exercised in reading only once; some twice, weekly; and others, daily. In these latter institutions, however, the higher classes do not read. The reason assigned is, want of time. Other studies are deemed to be of more importance. With such reasons your present essayist takes issue, and will present his views. It may possibly appear in the discussion, that true educational economy will consist in giving much more time and instruction to the classes in reading, since, by so doing, habits will be formed enabling the pupils to understand more quickly and thoroughly any lesson assigned to them; and so the time spent in the reading exercise will be more than gained for lessons in any department of science.

Perhaps many of you can recall to mind, as I can, all your instructors in reading. At any rate, through public school, academy and college, I cannot recall a teacher who gave me any other instruction in reading than that referring to pronunciation, inflections and pauses. And our reading books seem constructed on a similar plan. In most of them, from fifty to one hundred pages are filled with definitions and rules for orthoëpy and expression, embracing articulation, syllabication and accent; tonics and atonics; diphthongs and digraphs; consonants and cognates; alphabetic equivalents and slurs; inflections and force; circumflexions and pitch; and so on, with all kinds of marks and points down to the subdivisions of a comma. Most of these are found in our spelling books and grammars. As specimens of definitions they are good; but in reading, how many of them are of any use save to the elocutionist. And even the good speaker gives his intonations and inflections according to his idea of the sense, and



if need be, makes his rules afterward. But not one in a hundred becomes a public reader or speaker, and we know that more than ninety-nine per cent. of all our reading is done in silence. Oral reading is designed to convey information from the book to the hearer; and, insomuch, correct pronunciation is desirable. But it seems to me that in teaching we should remember that most of our reading is for personal information. Studying a lesson is nothing more than reading it, while merely committing it to memory is not reading it. Our aim in teaching should be to make the pupil comprehend and then retain the thoughts of the author studied. To do this we must early and persistently teach him how to read by himself.

So long as pupils are under our instruction, every reading lesson, as well as recitation, should, at the end of every sentence, have this stereotyped question, "What does it mean?" During a public examination how many teachers dare to ask for definitions and allusions, lest the questions remain unanswered. They might, possibly, obtain some such result as follows: During the past year I. one day, heard the reading exercise of a class, whose lesson was "The Battle of Warsaw," commencing thus:

"O sacred truth! thy triumphs ceased awhile,  
And hope, thy sister, ceased with thee to smile,  
When leagued oppression poured to northern wars  
Her whiskered pandours and her fierce hussars."

A young lady, not long in school, but considering herself a good reader, was called upon to read the stanza of which these lines were a part. She pronounced all the words correctly, and seemed to think she had done very well. My first question was, "What is the meaning of the word *leagued*?" After hesitating a moment, she answered, Yankee-like, "A league means three miles, don't it?" I next asked, "What is the meaning of *oppression*?" Insisting on some kind of an answer, she gave the following: "Oppression means making one do what he don't want to." "What does *poured* mean?" "To empty out," was the answer. "What do you understand by *northern wars*?" Answer, "The rebellion." "What is the meaning of *pandours*?" "I don't know." "What is the meaning of *hussars*?" "I can't tell." Let us now translate these two lines according to her definitions, and see how clear a view she had of the poet Campbell's idea. "When three miles of making one do what he don't want to emptied

out into the rebellion her whiskered I don't knows, and her fierce can't tells," etc. Surely, if the author could have heard her explanation of his idea, he would have repeated the first two lines :

"O sacred truth, thy triumphs cease awhile,  
And hope, thy sister, ceased with thee to smile ;"

Though, I think, he would have smiled himself. The truth is, the girl had learned to pronounce words, but had never learned to read. Had she consulted Webster's Unabridged, she would have found the meaning of every word—that "pandours" were light infantry or foot soldiers, so named from a mountainous region in Hungary where they were first enrolled, and that they were in the Austrian service—that "hussars" were the national cavalry of Hungary, armed with saber, carbine and pistols, and that they received their name from the fact that every twenty families were compelled to furnish one mounted soldier with horse and equipments, the word being compounded of "twenty" and "family," thus embalming, as it were, the history in the word. Had the girl consulted the American Encyclopædia she might have learned enough of the history of Poland to tell what nations were leagued for the dismemberment of that unfortunate country.

The pertinent question of Philip to the eunuch, "Understandest thou what thou readest?" should be often on the teacher's tongue. All needed books for aid should be at hand for the use of the pupils. Lexicons and encyclopædias are so many helps to read understandingly. Let their daily use be tested by asking the pupils to give the meaning of the author as he understands it. Thus will be cultivated the power of expression, a power greatly needed. For it is one thing to pronounce the words of a thought already expressed, and quite another thing to take the thought and clothe it with fitting words. This is required in the study of languages, and this it is that gives to the classical students such facility in the utterance of their thoughts.

While much is said about the correct pronunciation of the words, let more be done concerning the correct meaning and expression of the thought. Better far that we should mispronounce than misunderstand. Better a discord in the ear than in the mind. I hold that the right understanding of the words, as arranged in the sentence, is the best help for correct enunciation.

But what I plead for now is the imperative duty of teaching our pupils *how to read* for their own highest good. So long as they are our pupils, let them daily read and be required to express, as fully as possible, the thought of the author. The benefit of this will readily appear to all who understand the power of habit. Drill pupils till they acquire this habit of careful reading, and then it matters little what they read. If they read geography, the map of the world must appear before the eye of the mind. If they read history, facts, their causes and influences, will be marshaled into their proper places. If they read mathematics, every sign and symbol will be understood, and the end sought in every proposition will be reached by appropriate steps. If they read grammar, they will perceive the natural classes and uses of words, and the appropriateness of that syntax which holds all our words together, as the string holds the necklace of coral, pearl or gold. If they read physiology, they will have as clear an idea of the functions of all parts of the body, and the method of keeping them in healthy activity as the author has expressed. And so with æsthetics, ethics and metaphysics. In thus teaching we show our pupils how to get before their own minds the opinions of the authors read. The discussion of these opinions, whether right or wrong, will be more easily carried on when the opinions themselves are clearly understood. But I am not treating of discussion or criticism, but of learning how to read. These in their proper places. Suppose, now, we take our pupils as soon as they come to us for instruction, and give them, daily, this kind of drilling, and hold them to it till the day they leave us, will they not go out into the world better readers than many now do ?

The lawyer examining a case, or the divine his text, knows what I mean by reading ; and more than this, they know how much better it would have been for them, had their early teachers thus trained them, instead of leaving them to find it by experience.

In this method of teaching, the English student has the same kind of drilling as the student in Latin, and will be behind him only so far as he has examined a less number of words. So far as he does read, he understands and can tell what he has read.

In conclusion, would not more time spent in thus teaching *how to read*, make better scholars, even though they read fewer books ?

## THE NATURE AND METHOD OF TEACHING MATHEMATICS.

BY WILLIAM D. WILSON, D. D., LL. D.,

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In venturing upon a subject so far from my more appropriate sphere, I feel that an apology is due to the many able and skillful teachers of mathematics who are here present, or to whom this essay may be submitted. With me mathematics has been both a matter of interest as a subject of philosophic investigation, and of amusement and recreation, when fatigued and exhausted with other duties and studies; but my apology for thus venturing to enter into a field which belongs appropriately to others, and is beyond all question filled and cultivated by those far better than it could be by me, were I even to devote my entire energies to it, may be stated as two-fold.

1. It often happens that our greatest minds, and those who are most thoroughly conversant with a science, and especially if it be a profound and comprehensive one, are not the best teachers in it, are not, perhaps, very good teachers even, for any except those who are, or were, as far advanced as themselves. We often find, and I think it generally the case, that young graduates make better teachers for our younger classes in college than the professor with his maturer scholarship and riper age.

2. We learn all things by contrast and comparison. It is said that not a language spoken by any savage nation has a word to denote the savage mode of life, any more than a word to denote civilization. So in every community; the man who has been brought up there, and has always resided in its midst, has allowed many of the characteristics which are most peculiar to and distinctive of its civilization, to escape unnoticed. The best of the smaller treatises on the English Constitution was written by De Lolme, a foreigner by birth and education; and De Tocqueville's work on America stands at the head of all criticisms on our

Constitution and laws—regarded as an attempt at a scientific exposition of them.

Hoping that this apology will be accepted as sufficient, I will, after a few preliminary statements and illustrations, enter upon my subject.

Mathematics, in its most comprehensive sphere, may be referred to five distinct parts :

1. Arithmetic, in which we deal with *specific quantities*. We take *objects*, whether of perception or imagination, abstract from our conception of them all, but their essential existence and, call them "*units*." Of course, therefore, it is no matter what is their size, their density, their composition, their form, or their color. We deal with them only as having being, possible or real.

2. Algebra, in which we deal with the *relations* and *combinations* of quantities. Hence, for numbers we substitute letters or arbitrary signs and symbols, that our attention may be withdrawn from the specific values to their relations, addition, subtraction, multiplication, division, involution and evolution, etc., which are the same in process and in result whatever may be the values attributed to the symbols used, as *a, b, c.* etc., for known quantities, and *x, y, z,* etc., for the unknown. In algebra, we are studying the laws of combinations and transformations and the processes of calculations.

3. In geometry we deal with *magnitudes*. It is sometimes said that geometry is the science of form. But form is also the periphery and limit of magnitude and distance, and incidental to them. We consider objects as simple, incomplex wholes, and apply them one to the other, the known to the unknown, as means of measurement. Hence in every determination of size and distance we determine a point in the form of an object, and all the points when taken together make its periphery or form.

4. *Analytical Geometry*. In this department of mathematics we consider magnitudes as made up of an indefinite number of parts or "*points*." And hence as the letters of the alphabet used in algebra as symbols of numbers denote no specific number, except as we choose to assign them such a value for the occasion, they may be used to denote lines and angles, surfaces and solids, considered as made up of an indeterminate number of parts or points.

From this fact first fully appreciated by Descartes, I believe results the important law, that

Whatever result may be obtained *algebraically*, by means of symbols thus used to denote magnitude, whether lines or angles, surfaces or solids, will be true *geometrically* of the magnitude they are used to denote.

This principle lies at the foundation of all *analytical* mathematics, or rather at the foundation of what is known as the analytical method in mathematical investigations. And from this principle, it results that every algebraic term or *equation* may be changed in form or expression at pleasure so long as we do not change the value of the term and destroy the equation : and every form or phase into which the term or equation can be changed under these conditions will represent a mathematical truth of the object denoted by the term or equation.

It is common to say that we can thus obtain by analysis geometrical truths that are unattainable by the geometrical method. This, however, is probably stating the matter rather too strongly. It is indeed true at the least, that we can attain results by this method that would require a continuity of thought—a power of imagination and a grasp of comprehension that would be difficult if not impossible to most men. And yet I am inclined to the belief on *a priori* grounds that there is no truth pertaining to magnitudes or distances that cannot be proved geometrically if we only have the grasp of intellect and the patience of perseverance that the operation may require.

5. But in the fifth place we have the *Calculus*. In this department of mathematics we deal with *motion*. We consider objects, whether quantities or magnitudes, as the product of *motion* or *growth*, and we measure compute and calculate past, present and future values by the *rate* of increase, motion or growth. And here the element of *time* enters into mathematics just as that of *space* did in Geometry.

We call the increment of any number or magnitude which it receives in a moment of time its differential. But like the point in space, the moment in time and the differential in change, are of no constant or definite value ; they are rather most conveniently changeable. We *may* make the moment to be so short as to be indivisible and we *may* make the differential so small as to be less than any assignable quantity. And then if we will be careful to watch the opportunity we may regard it as nothing or zero, neglect it altogether, and derive some most important results from this mode of treating it. But in other respects and for other pur-

poses we may make "the moment" a day, a month, or even a year; or the differential even may come to be of an almost incomprehensible magnitude. All that is necessary for a differential equation is (1) that the moments shall be of the same length of time for both variables and throughout the entire limits within which the variables may change; and (2) that the differential coefficient of the function shall be that by which as a factor it is necessary to multiply the differential of the independent variable for any given moment in order that the change of the two variables may be made equal for that moment.

It is commonly held that the Calculus is a means of carrying our investigations beyond what we could otherwise reach, and of establishing truths that must otherwise have ever remained unknown to us. *Practically*, this is true; but theoretically it is not. For, as I have already remarked in regard to the analytic method, whatever is true of magnitudes or distances at all—or of anything that we can represent by either magnitude or distance—can be proved *geometrically* by him whose mind is equal to the task. Nay, to the Infinite mind it is intuitive, and needs no proof. But for us, and with such faculties as we possess, it is beyond question that truths and facts are brought within our reach by the use of differentials, which neither geometry nor analytics could have enabled us to discover and grasp. In the geometrical method we must follow the demonstration at each step, conceive or imagine precisely how the magnitude is effected or changed, and see by insight that the change in form or position, which we propose to make, does not alter the value or amount of what is changed. But the moment we apply either the analytic or the differential method, this following the object at each step, and seeing exactly how it looks, or is affected, with any change, becomes unnecessary and we need no longer have insight of the effect of what we do as our guide and dependance. We may depend now upon the nature of the process and method we employ. Of this nature we have learned in our Algebra, in part, and we continue that knowledge throughout all the principles and formula of Analytical Geometry and the Calculus. In what is called Descriptive Geometry alone do we make any attempt to continue the geometrical method up into what is properly called the Higher Mathematics.

Of these five methods, Arithmetic, Algebra, Geometry, Analysis and Differentiation (with its converse integration), *two* only are

primarily and in themselves absolutely indispensable—namely: Arithmetic, or the method of computing with specific quantities; and Geometry, the method of comparing and measuring magnitudes. For (as I have already said), we could, if our minds were adequate to the task accomplish by the mere geometric method, all that we now obtain by the analytic and differential methods, so also, under the same circumstances we could dispense with algebra altogether, and accomplish all that is in its nature at all within the domain of number by arithmetical means alone.

We have then in mathematics two subjects alone to deal with, number and magnitude. But those terms—"number" and "magnitude" are abstract, and denote no ontological realities. We must therefore go a little further in our metaphysics of mathematics before we are quite prepared for our ultimate principle of classification and method.

Number is an abstraction derived from considering objects, whether real or imagined, as having being alone—that is, we abstract or withdraw the mind from the consideration of all their objective, differential or distinguishing properties, and call them "units." But a unit is no reality—it is a pure fiction, the word is supposed to denote something, without size or form, color or density—something that has being, or existence, alone, so that one is not analagous to another—but *one* is another for all the purposes of computation. Thus anything that is, or that may be, conceived of or imagined is a unit, and all the results of our computations must apply to and be true of whatever is, or can be supposed to be, or have being at all.

And so with magnitude, the word denotes an abstraction. In the science that pertains to it, we think of objects—whether real or imagined, as having size, color, and if size, then of course "form" and distance from point to point in the mass or the periphery that surrounds it. But we obtain our conception of magnitude and form by abstraction. We withdraw the mind from thinking of any of the other properties of the objects we see, and then call that which we are thinking of, size, magnitude, form, &c.

So true is this that in those cases where we can see no object whatever, and in the distances of objects one from another—we fancy a substance extending from one point, or object, to another, and call it "*space*." Space is an ontological absurdity. Nothing answering to our conception of it can exist. It has no real properties. Like the point, the line, &c., it is a convenient—perhaps



an indispensable fiction. And the same may be said of "time," or that which is supposed to have protension alone, or extension from one event to another.

Hence in the last analysis Mathematics deals with objects—real or imagined, in the abstract—as being one or many, and as having magnitude or size, and, as incidental to magnitude, form and divisibility, and finally (as in the Calculus), as having grown or increased at a certain rate, or in a certain ratio of time up to their present dimension in space, and perhaps as still increasing or diminishing.

If now we pass to consider the *order* in which these five methods should be studied by the pupil—and this constitutes the real subject, on account of which I have presumed to offer this paper to your consideration at all—there can be no doubt, of course, that Arithmetic must come first. Until the pupil knows that three and two make five, &c., he cannot be made to understand what the signs of plus and minus mean in Algebra. Hence something of Arithmetic must come before Algebra—but for those who are designing to pursue a complete course of mathematics—such a course as is accomplished in our colleges generally—I am inclined to think a much more brief and simple Arithmetic than any of those that are now used would be desirable—leaving much that that they now contain until the pupil shall have pursued the higher branches of mathematics.

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But when shall we introduce the Analytical and the Differential methods? These are the questions to which I wish to ask special attention, and in regard to which my suggestions would make a wider departure from the common practice and usage than in any other department of mathematical study.

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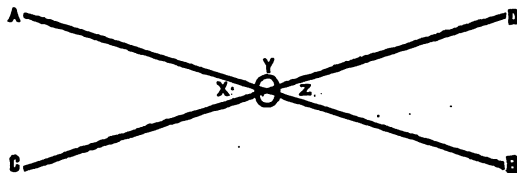
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But if two variables, *having the same differential coefficient*, are ever equal at any one moment, they are always equal. Hence

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Were I writing for learners in mathematics rather than for teachers and professed scholars, I would furnish many more examples; but for such as I now have the honor to address, more would be unnecessary, if not presumptuous, in me and tedious to them. Permit me however to state that some years ago I had occasion to teach a young man in Geometry, who, although uncommonly brilliant in most if not all other studies, had failed to accomplish anything in this department of his mathematical studies. He was preparing for college and otherwise prepared; but his Geometry was to him incomprehensible. The text book used was "Davies' Bourdon." I at last resorted to the method now indicated, using in most cases the differential method without, of course, its technicalities, and the delight and the rapidity

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In conclusion of my paper, I propose to state very briefly *three* advantages, or benefits, that I expect will accrue from the adoption of the method I suggest.

1. I think that we should make a saving of about one-third of the student's time, or what is the same thing, acquire the usual amount of mathematical knowledge in two-thirds the time now devoted to pure mathematics in our colleges. Or if we choose, we might accomplish a correspondingly larger amount in the time *now* devoted to that department.

2. By familiarizing the mind of the pupil with the Differential and Integral method early in his course, and more especially by the use of it in the solution of the simpler and easier problems, such as can be easily solved, indeed without the use of the differential, he will acquire an early and an easy mastery over this which is perhaps, on the whole, the greatest instrument in the discovery and setting forth of truth that the genius of man has ever been able to invent.

I have already alluded to what seems to me to be a great practical evil, the postponing the introduction and explanation of the differential method and its converse, the integral, until we have come to those questions in mathematics which are beyond our powers without its aid. We thus give the impression, very unnecessary as it seems to me, that the Calculus is hard and difficult of comprehension and produce discouragement and demoralization in our classes to a very large extent before we begin our work. Then, as is natural at that stage of our progress in mathematics, the examples selected as illustrations are but too often if not always such as *need* the Calculus to make them intelligible and comprehensible, instead of being such as have already been easily understood without the use of its formula and technicalities.

But in the order I propose, the pupil will have become familiar with his method long before he actually needs to use it; accustomed to his armor and to all the evolutions of his campaign before he enters the actual conflict in which he needs all this kind of skill for the pressing and instant emergency.

3. My third point I shall only mention. It results from the superiority of the differential over all other methods as a means of intellectual development, and of increasing the powers and

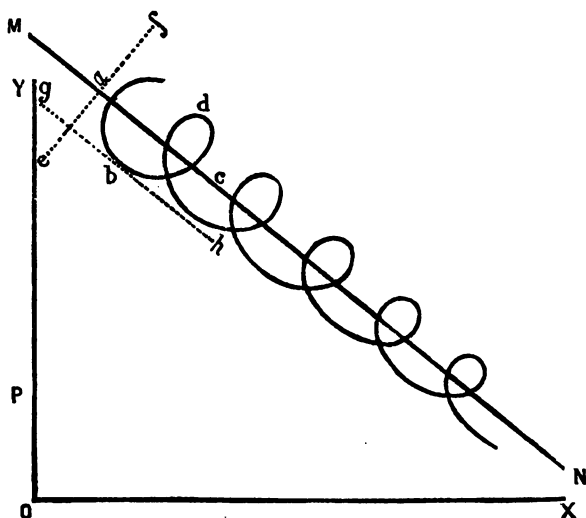
habits of comprehension. Of this superiority nothing need now be said, as it is obvious to all who have any knowledge of the subject whatever. If then we begin to use this method *early*, apply it as a Professor of Mathematics told me he was in the habit of doing to the ordinary business of life, as computing interest, &c., we not only get the minds of our pupils accustomed to its use, but we also get rid of the bugbear fear or dread of the Calculus as something incomprehensible in itself, and what is more we take what I regard as the most effectual means, and use the most powerful instrument for training the mind to those comprehensive views, that steady contemplation of subjects, and that power of grasping a multiplicity of details, and of seeing a subject in all its changes and variations and relations, in which what is called genius for practical affairs, consists.

I am bold enough to think that we scarcely begin to realize as yet the extent to which this method of mathematical reasoning may be applied and made most eminently useful. I have said that mathematics is not my specialty, by any means ; but it has fallen to my lot for some years past to teach Political Economy, and I have been accustomed to express its laws, and principles, in mathematical form, largely using differential equations, and with the most satisfactory results. It will most frequently happen indeed in the present state of our knowledge, and perhaps always, that we cannot find the exact differential co-efficient for the variables we have occasion to deal with. But we can find its *nature*, whether it be a whole number, or a fraction, positive or negative—and what is the nature of the two series into which the successive states of the variable and its function respectively may be expanded. And in this way we can ascertain in a general way, and exactly enough for all the purposes of the science, and the statement of mere general principles—results that are otherwise beyond our reach.

In fact I am accustomed to make the assertion—which will, of course, surprise and astonish the advocates of mere *a posteriori* science—the devotees to the study of “facts,” as they call them, namely: that no law, no comprehension of the facts themselves, can be obtained from a mere study of the facts ; no law can be proved in the *a posteriori* method by induction, average, or generalization—by any accumulation of facts, however numerous they may be.

For, consider, a fact is a mere state, mode or condition of a

variable substance. Take, for example, a piece of iron, whether a gas, a fluid or oxyd ; whether existing as steel in form of a knife-blade or as mere iron in a horse shoe ; it is a mass of variable iron in some one or another of its possible conditions. Now the condition or mode is the essential part of the "fact," as we call it. But this mode or condition is the result of forces of some kind which have been acting upon it ; these forces act by laws which can be expressed in mathematical formula. The "facts" and the "forces" may be obtained from observation ; but the law of their action and their results can be obtained only by reasoning *a priori* from the nature of the forces themselves. Hence these successive stages in the existence and condition of any substance, which we call "*facts*," may be considered as the consecutive differentials of a variable, and any fact itself as expressive of the value of the variable at that stage or for that "moment."



Now suppose these successive stages or conditions of the variable mass to make a curve line of the form *a, b, c, d, e, &c.*, or in fact any curve of the higher order lying in a plane and that *O Y* and *O X* are the axes of ordinates and abscissas respectively. Now suppose an observer to stand at any one point, as *P* (and every observer, except the Infinite Himself, must be confined at any one given moment to one point of observation), and suppose the object to be at that time changing as at *a* in the direction of *f* to *e*, he may get any number of "facts" to prove that the tendency of the motion is from *f* to *e*. If it was at *b* he would in like manner

get "proof" unlimited in amount that it was moving from  $g$  to  $h$ . And so if the observer should see it while at  $c$ , or at  $d$ , he would be able to prove that the law, or general axis, of its motion, which is in reality the line  $M N$ , is not only in the direction  $f e$  and  $g h$ , but in every other conceivable direction. And since the number of differentials between any two points in its progress may be regarded as infinite, any number of facts, if used by mere generalization, average or induction, may be adduced to prove what is after all contrary to the truth, or at least inconsistent with it.

If now we know the forces that cause the motion, and produce the changes we can reduce them to two, and we have the equation of the line, which expresses the law of its motion and change, in the form of

$$y = (f) x$$

and from this we can find not only the general axis of the curve which is the law of the change of the mass, but also the position of the changing mass at any one moment of its existence. And we can see at a glance what it can become, and what it cannot, even without the trouble of computing the precise value of its differential coefficients for any particular time. Or if the line be not in a plane, as I have thus far supposed, then it is, of course, in space, and we shall be obliged to resort to the equation with three variables.

Now there is not a particle or a mass of matter that does not come within the scope of this formula. The condition of the particle, or mass, is "the fact," or "effect," and to comprehend the effect, to understand the past condition and history of the mass, or to foresee its future changes, we must know the causes that now are, have been, or may hereafter be, at work, and the laws by which they work.

A familiar example may make more obvious what I have been saying. Water, as is known, expands with the temperature, according to a certain law, so long as the temperature is between  $39.5^{\circ}$  Fahrenheit, and the boiling point. Below  $39.5^{\circ}$  it expands with cold under a very different law. At  $212^{\circ}$  and above, it observes still another law. Now any number of "facts" may be adduced in proof of either of these laws of expansion, without so much as a hint at any point where the law changes. But without experience of water in the states of ice and of steam, and without knowledge of the forces which cause these changes, we could



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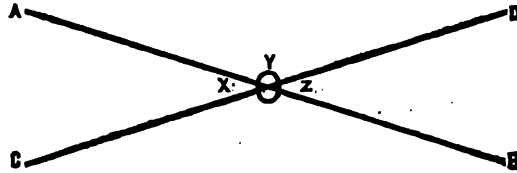
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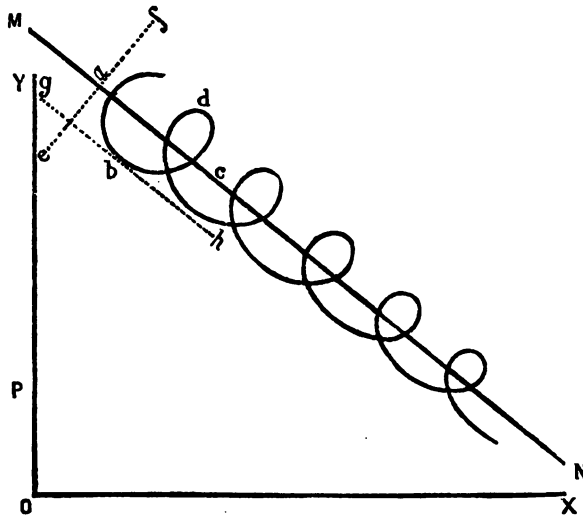
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variable substance. Take, for example, a piece of iron, whether a gas, a fluid or oxyd ; whether existing as steel in form of a knife-blade or as mere iron in a horse shoe ; it is a mass of variable iron in some one or another of its possible conditions. Now the condition or mode is the essential part of the "fact," as we call it. But this mode or condition is the result of forces of some kind which have been acting upon it ; these forces act by laws which can be expressed in mathematical formula. The "facts" and the "forces" may be obtained from observation ; but the law of their action and their results can be obtained only by reasoning *a priori* from the nature of the forces themselves. Hence these successive stages in the existence and condition of any substance, which we call "*facts*," may be considered as the consecutive differentials of a variable, and any fact itself as expressive of the value of the variable at that stage or for that "moment."



Now suppose these successive stages or conditions of the variable mass to make a curve line of the form *a, b, c, d, e, &c.*, or in fact any curve of the higher order lying in a plane and that *O Y* and *O X* are the axes of ordinates and abscissas respectively. Now suppose an observer to stand at any one point, as *P* (and every observer, except the Infinite Himself, must be confined at any one given moment to one point of observation), and suppose the object to be at that time changing as at *a* in the direction of *f* to *e*, he may get any number of "facts" to prove that the tendency of the motion is from *f* to *e*. If it was at *b* he would in like manner

get "proof" unlimited in amount that it was moving from  $g$  to  $h$ . And so if the observer should see it while at  $c$ , or at  $d$ , he would be able to prove that the law, or general axis, of its motion, which is in reality the line  $M N$ , is not only in the direction  $f e$  and  $g h$ , but in every other conceivable direction. And since the number of differentials between any two points in its progress may be regarded as infinite, any number of facts, if used by mere generalization, average or induction, may be adduced to prove what is after all contrary to the truth, or at least inconsistent with it.

If now we know the forces that cause the motion, and produce the changes we can reduce them to two, and we have the equation of the line, which expresses the law of its motion and change, in the form of

$$y = (f) x$$

and from this we can find not only the general axis of the curve which is the law of the change of the mass, but also the position of the changing mass at any one moment of its existence. And we can see at a glance what it can become, and what it cannot, even without the trouble of computing the precise value of its differential coefficients for any particular time. Or if the line be not in a plane, as I have thus far supposed, then it is, of course, in space, and we shall be obliged to resort to the equation with three variables.

Now there is not a particle or a mass of matter that does not come within the scope of this formula. The condition of the particle, or mass, is "the fact," or "effect," and to comprehend the effect, to understand the past condition and history of the mass, or to foresee its future changes, we must know the causes that now are, have been, or may hereafter be, at work, and the laws by which they work.

A familiar example may make more obvious what I have been saying. Water, as is known, expands with the temperature, according to a certain law, so long as the temperature is between  $39.5^{\circ}$  Fahrenheit, and the boiling point. Below  $39.5^{\circ}$  it expands with cold under a very different law. At  $212^{\circ}$  and above, it observes still another law. Now any number of "facts" may be adduced in proof of either of these laws of expansion, without so much as a hint at any point where the law changes. But without experience of water in the states of ice and of steam, and without knowledge of the forces which cause these changes, we could



have no suspicion that the rate of condensation would not continue from  $39.5^{\circ}$  to  $39^{\circ}$ , as it was above  $39.5^{\circ}$ , or become different at  $212^{\circ}$ , from what it had been below that point.

We may undoubtedly learn general facts by observation and induction, as that all horned animals are ruminant, all resins are electrics, &c. But these mere general facts can hardly be called laws in any proper sense of the word. A law is a rule of action, the rule by which any force acts. And to say that all resins are excitable electrically by friction, is merely to assert a fact. Why it is so we do not know. Both the cause and the law by which it acts are unknown.

What we *assume* in order that we may prove a law by induction, or other *a posteriori* methods, is that the forces that act are always the same, both individually, and act with the same intensity, that all the changes that can take place are in the line (which is assumed to be a straight line) of the resultant. But this is an assumption that takes for granted in many cases more than we know, or have any right to presume. In fact it takes for granted what in many cases we find to be untrue. Take, as examples, the questions in Political Economy—concerning the ratio between the increase of population and the increase of the products of the earth, or the question as to the ratio between the contribution of the forces of nature and that of human energy, in the production of wealth; or, again, the law of distribution, as between capital and labor, as society advances from the poverty of the savage state up to the wealth of the highest civilization, the "law" in each of these cases is found to be an exceedingly complex curve, with many points of inflection and singular points, that at first sight and looked at merely *a posteriori* seem to have no connection with known laws and forces, except it be to set them at defiance and throw distrust upon the whole subject. Nevertheless, when looked at *a priori*, they are seen to be conformable to law, and the law itself becomes intelligible, nay obvious at a glance.

I have spoken of this method of reasoning chiefly in reference to inanimate masses of matter. But man also, and that part of his action which we call moral, falls more largely than we should at first suppose possible into the same category. The best illustration and proof of the fact of moral freedom that I have ever seen or been able to invent is expressed by a differential equation. It is one that I have been accustomed for years to give to my

classes, and I have never known it to fail of giving both satisfaction and conviction.\*

But if we pass from the consideration of individual men and their personal actions to the consideration of them as masses in their social actions and movements, we find that they correspond much more nearly with mere inanimate masses of matter, so far as the laws of their actions and the motives that act upon them are concerned.

In all these cases we can best understand, perhaps I should be authorized to say and fully justified in saying, we can only understand their rules and laws of action when we consider them as products of the forces or motives that led to them. We can, moreover, express this in a formula that will be intelligible at a glance to all those who are at all familiar with the symbols of differential reasoning, and the principles that underlie and explain them.

Nor is this all. If we note carefully and consider the matter we shall find men everywhere—even those who know nothing whatever of the usual formula and technicalities of the Calculus—reasoning in almost every department of thought, on the very principles that are brought out and exhibited, stated and explained in works on the Higher Mathematics. In fact, in our reasoning concerning anything that is subject to change, we may regard that object as a variable, and all our speculations and

\*The illustration or argument referred to in the text having been called for by the Convocation, was furnished somewhat as follows:

The *Effort* required or put forth in the performance of an act may be resolved into two parts, *Motive* and *Volition*, or *Will*. We shall have then—

$$M + W = E$$

I am accustomed to suppose a very simple case—some obstacle on the floor. The *motive* to get rid of it depends upon the amount of annoyance it causes, and to no degree upon the difficulty or ease with which it can be removed. We stoop down and attempt to pick it up, and toss it away under the impression that it weighs but a few ounces. It does not come; we put too more effort—an effort equal to moving five or six pounds—and it comes.

Now stating the above question as a differential equation, we have—

$$dM + dW = dE$$

But as in the case supposed, *M* remains constant, while *E* increases, we have—

$$dW = dE$$

consequently *W* is a reality and a force, since its increment must be equal to the increment of *E*, while *M* is constant, as that which is nothing can have no differential or increment.

Hence we have the inference—which is doubtless true in morals—that in some acts nothing but *Motive* alone is active, as in what the physiologist calls the reflex actions, and actions in which *Will* is chiefly, if not wholly, active; while in most actions it is probable that both *Motive* and *Will* enter in varying degrees of intensity.

inquiries concerning it, the forces that produce it, and the laws in accordance with which these forces act, become virtually, even when they are not stated in express form, a differential equation. It is very seldom, if ever, that this reasoning implies the use of either a circular or an exponential function. And, as I have already said, the precise value of the differential coefficient is seldom stated, and for the most part unknown, and perhaps even the ratio between the rates of variation of the variables is not constant—varying by no known law—and known at most to vary only within certain limits; and yet, notwithstanding all these mathematical defects and deficiencies, the method of reasoning is of inestimable value, and affords results sufficiently definite and precise for all the practical purposes that the occasion requires. And consequently the study of this branch of mathematics, if introduced and used, and explained so as to make its principles familiar to all educated men, cannot fail to add greatly to the ready tact and business efficiency of men in all departments of business, and in all the varied walks of scientific recreation or discovery.

## THE RELATIVE VALUE OF STUDIES PURSUED IN ACADEMIES.

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The object of school education is to discipline the mind by acquiring useful knowledge. This object should be kept steadily in view; by it we should be directed in the choice of studies and the method of pursuing them.

Men will always train themselves for what in their time is considered most excellent. In the early ages, when physical prowess and superiority made the hero, the greatest care was bestowed upon the body; afterward, when the unworthiness of this course was appreciated, the opposite extreme followed, and the mind was educated, to the neglect of the body; and not until the present age has it come to be practically understood, that the highest mental culture is to be attained only in connection with physical health, and that what God has thus joined, man cannot put asunder.

Let us ever bear in mind that God has made all things by some definite plan; that we ourselves, and the external world, are to move by laws of His ordaining, that our highest attainment in this life must be to discover those laws, and our highest wisdom to conform to them. This one fundamental truth, well followed, will save us from a thousand needless errors, will reconcile what otherwise might appear contradictory, and conduct us by plain and natural methods to the object of our search. The most dangerous error has in it a partial truth, and the error is the more dangerous, because, when assailed, it presents the partial truth as a shield, and claims with it a necessary connection. Instances of this are not wanting in the history of education.

Many of our educators, perceiving the inferiority of mere knowledge as an end, and justly ridiculing what they term the "pouring-in process," have made their greatest and sometimes almost their only argument for a given study or class of studies to be the disciplinary value. Now this argument, though very plausible, is fallacious. It proceeds upon the assumption expressed or implied (unfortunately usually implied), that the best discipline

is not to be found in connection with the most practical studies. Has God, then, so constructed my thinking mind and the related objects of knowledge, that I must look in one direction for the most useful knowledge, and in another direction for my highest mental discipline? Do we in fact perform the great and necessary operations of the body or the mind from this motive? No. I do not breathe for the sake of disciplining my lungs, nor eat and drink for the sake of disciplining my stomach, nor pray for the sake of the beneficial reflex influence upon my own faith; but I breathe and eat and drink, that I may live in health and so be enabled to perform the great duties of life, and I pray that I may obtain the very blessings for which I ask.

How does the Indian acquire his remarkable power of detecting by his eye the minutest trace of the footstep. Not, surely, by practicing to discipline his eye, but by trying again and again in actual cases. Why does the athlete train himself so long and carefully, and bring all the muscles to their greatest vigor? Certainly not for the sake of having a well developed body, but in view of the coming contest and the prize which he hopes to win. We go against all the analogy of nature, and do in fact thereby, though unintentionally, impeach the wisdom of our Maker, by supposing that in our studies practical knowledge and mental discipline can be wisely separated.

Illustrations without number might be drawn from the various fields of human labor, to confirm our belief that we shall secure for every faculty of the mind its highest development, by allowing it to perform its natural function, and not by giving it a special drill in some mental gymnasium of our own construction. We should, therefore, in the choice of studies, be guided by their utility, knowing that if we pursue them aright, we shall receive abundant mental discipline. Life is short; we cannot afford to spend half its years in getting ready to learn what is useful.

A school education in our day takes far wider range of subjects than in former days. Every field of inquiry has been more diligently searched, the boundaries of every science enlarged by repeated discoveries, new sciences and arts called into being. But there is a natural limit to the capacities of the human mind, just as much as to the powers of the body. One may lift directly a few hundred pounds, but not a million. The memory of some appears almost infinite, but it cannot grasp and retain everything, and at last it fails. So by the extent of the ever widening field

of human inquiry, and by the very law of limitation in our mental power, we are compelled to choose among the various objects of knowledge. There are, too, important limitations arising from other causes, the brevity of life, variations of health, the pressure of business, the ever-recurring necessity of labor for our daily bread. We may take few studies and go far in each, or we may take more studies and go over proportionally less ground in each. It is desirable that in school we should acquire, at any rate, some general knowledge of the various sciences, and their relations to one another, and then in preparing for our calling in life we can pursue more fully the few studies that our calling more specially demands. So important are the above mentioned limitations, and so urgent the consequent demand, that our colleges are recognizing the claim upon them, and are more and more providing special elective courses.

The shorter the time allotted to school education, the more limited must be the preparatory general survey of studies, and the fewer the subjects of special attention; the more important, too, it becomes for us to be guided strictly by these two principles, that the great object to be sought is utility rather than mere discipline, and that this object is most important when necessity compels us to a most limited range.

Teachers that have been engaged for any considerable time in giving instruction in academies and similar schools, cannot have failed to observe that many students are inclined to pursue studies by no means best adapted to their real wants. This results from ignorance on the part of the scholar, the parent, or, perhaps, the teacher. Take for example the following case, and it is a sample of a large class. A young man, sixteen years of age, the son of a well-to-do farmer, has, through his early boyhood, attended the district school, but, for several years past, being old enough to render valuable service on the farm, he has attended during the winter only. At the district school he has acquired a fair knowledge of the elementary English branches, and has studied Algebra one or two winters. Now he enters the academy, and proposes to attend two years, not steadily, but "*in* winters, and *out* summers," so that his two years of schooling will occupy about five years of time. The question is, "what studies shall he pursue?" Aside from whatever additional study of the common branches he may need, I think the best course for him would be the following: Physiology, Book-keeping, History, Rhetoric, Natural Philosophy,

Chemistry, Geology, Astronomy, Science of Government, Political Economy, Logic, Intellectual Philosophy, Moral Philosophy, Evidences of Christianity, and the Science of Teaching. This course would occupy the two years allotted. It does not include the higher mathematics, nor languages other than our own, for the reason that the coming duties of life demand the preference to be given to more practical studies.

But, as we find so frequently the case, the young man is very likely, in accordance with the views of teachers or parents, to pursue Algebra, Geometry or Latin, and leave out what would have taken no longer time to learn,—Science of Government, Astronomy, Political Economy, Logic, Moral Philosophy, Evidences of Christianity, or, perhaps, even Physiology. So he goes out from school, having spent term after term on Algebra, to him the least useful of all the studies pursued in school, having devoted valuable time to Geometry or Trigonometry or Latin, branches useful, to be sure, but by no means an equivalent for the others that he has sacrificed for them. Consider how poorly he is fitted for the responsibilities that await him. His health and life are to be gravely affected through his ignorance of Physiology. He is to engage in active business, yet he has never studied Political Economy, the science of wealth. He is soon to assume the duties of a voting, or an office-holding citizen, yet he has never studied the Science of Government. In manifold relations he is to influence the minds of his fellow-men, and especially, in the relation of teacher and parent, he is to mould the character of the young, yet he is profoundly ignorant of the great laws that govern the intellectual and the moral nature of every human being. He is on every subject in danger from fallacies, and he has not armed himself with the invincible weapons of Logic. He is to meet the cavils of the skeptic, and to decide for himself the most momentous question of this life, yet he has never examined with intelligence the evidence for the Christian faith. Judging by what he needs in after life, how much has he acquired that will not be useful to him then? How much has he lost that would have proved of incalculable benefit?

The error, too, runs farther back than the course of academical instruction. In the district school, where studies above the common branches ought not to be pursued at all, there is a great disposition to enter upon more advanced studies. And the least practical, the least desirable of all the higher branches, is the

very one first taken up. I do not object to this study as a useless one, or inappropriate in a more extended education, but I am convinced that, in a limited course, it usurps the place of studies more important for use and better even for discipline. I knew one excellent teacher that was unsuccessful in his application for a district school, the only reason being that he was unable to teach Algebra. In advising young men to give the preference to other branches, I have often met the reply that they were well aware of the greater utility of the other branches named, but they expected to teach a district school, and a knowledge of this branch would be expected or required. The fact is, the study of Algebra in our district schools ought to be prohibited by law. What, after all, do we mean by *practical*? I call that practical to me which, in my circumstances, I may profitably use. Were I to-day a missionary in China, I should think seriously of learning the Chinese language; but, to me living in this country, it would be the height of folly to spend time in acquiring that language. Now consider the case of a person so restricted in his opportunities, that he may pursue as one of his studies during a year's time, Algebra, or may take in place of it for the same length of time, Logic and Moral Philosophy! What should be his choice? If he takes the Algebra, he will spend his time on mathematical reasoning, exactly the kind not required in the ordinary affairs of life; nor does the very knowledge gained pertain to the business or the duties of ordinary life. But, if he studies Logic, he trains the mind in the very art of reasoning, which art is of universal application; and, when he studies moral science, he applies this reasoning to the great duties-to God and to his fellow men. Hardly a day passes when he needs the first of these studies; not a single day passes when he does not greatly need the other two. But it is notorious that where one young man goes from our academies with a knowledge of these last two branches, a hundred go with the knowledge of the first one. Again and again have I been deeply pained by finding young men fundamentally, though honestly, wrong upon the practical moral questions of daily life.

It is the province of the liberally educated, and especially of teachers and those having charge of public instruction, to reform public opinion in regard to the relative importance of different branches. The course of study for colleges and similar institutions, though, doubtless, still needing important amendment, has



received the careful attention of able minds. It is comparatively easy to lay out a liberal course, for here we measurably avoid the difficulty of choosing some branches and rejecting others. And if the great body of our people could enjoy the advantages of a liberal education, we should be relieved from the hardest work in planning. But we must provide for the wants of men, not as we should wish to have them, but as we find them. The great body of our people are receiving, and are to receive but a limited and partial education. That this education, necessarily limited and partial, may be wisely directed, must be the wish of every lover of his country or his race.

## THE CLASSICS IN EDUCATION.

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The study of the two great languages of the world's early civilization—so long our only means of intellectual discipline—is in our day frequently impugned as unreasonable and unjust. The world has advanced so far, we are told, in the scientific knowledge of nature, that we are no longer in the position in which we were when the Latin was the common medium of philosophical discussion, and the universal language of learned men. Why, then, waste our time in acquiring it, instead of passing over at once to the study of the great body of modern sciences?

A complete answer to this inquiry would require a more full exposition of the subject than can be given in the limits of a paper like this; but there are some considerations bearing upon this objection, for which a brief hearing may be asked.

I. In the first place, then, it may be well to inquire how far it is really true that the classical tongues have lost, in our day, their function of ages to be the vehicle of scientific truth. If the Latin is no longer the instrument of scientific research, it is, and it ever must be, in connection with its sister tongue, the Greek, the storehouse in which are deposited all the results of such research. It is at the present day, and it is continually becoming more and more, the common language of science, for the designation of all its discovered facts in natural history.

The science of nature is, I need not say, expanding rapidly on every side. The number of objects discovered has already become very great in every department of nature. The number of known plants is not much below 100,000; of insects there are supposed to be five times as many; while in every other department of nature, among the molluscs, the crustaceans, and the zoophytes, those still lower inhabitants of the deep, there are thousands of species more. The exploration of distant regions is yet going on, and every new explorer adds still many novelties to our catalogue of bird, and beast, and fish, and insect, in nearly every quarter of the globe.

Now every one of these newly discovered objects, before its discovery can become a fact of *science*, must have a distinct name. Without a very exact method of naming, it would be impossible to impart that order and system to our knowledge which constitute science. Indeed, without a well settled system of nomenclature, this vast multitude of known objects would be but an endless and indistinguishable confusion. It is, therefore, regarded as one of the great merits of Linnæus—the renowned naturalist of Sweden, in the last century—that he gave to the world a system of the most exact and simple kind; a nomenclature capable of indefinite extension as new objects should be discovered, and applicable to each separate branch of Natural History. He aimed to designate every known natural object by a compound name, consisting of two words, generally descriptive of its characteristic features. We distinguish persons in a similar way, by a complex designation, one part of which describes the family, and the other the individual. We call a man Smith or Taylor, designating thus the family to which he belongs; and we then distinguish him from others of that family by his personal name of John or William. So Linnæus described objects of Natural History, giving to each one a family, or generic, name, and adding a designation which distinguishes the species from every other of the genus. Thus, when his pupil, Kalm, brought to him a multitude of plants, from the then unexplored wilds of our own country, to describe and name, he found among them some of a genus entirely new. To this genus, forming a word from the name of the adventurous discoverer, he gave the designation of *Kalmia*; and the beautiful species before him, which we know so well in our common laurel, with its broad and shining leaves, he named from this circumstance *broad leaved*, or in Latin, *latifolia*. *KALMIA LATIFOLIA* then, became the permanent and elegant designation of the species, preserving at once the name of the discoverer, and the most striking feature of the plant, through all future ages of scientific history.

This beautiful system, carried out into the description of all the groups, wider or less wide, which we distinguish in nature, becomes a method of classification of very high value, and gives to our knowledge an orderly arrangement, without which science were impossible.

Now it is one of the great features of this system that the names are universally expressed in the Latin and Greek languages. The name of the genus is generally taken from the latter; that of the

species from the former tongue. When, for example, the remarkable investigator of the geology of Scotland, whose researches have shed such honor upon his country, Hugh Miller, presented to the British Association for the Advancement of Science, the strange organism which he had discovered in the Old Red Sandstone, and demonstrated its character as a fish; Agassiz, who was present, was requested by the association to give a name to the unknown and extraordinary creature. Observing its two fins projecting at right angles from its body, like the pinions of a bird, the philosopher named it at once from that characteristic circumstance; but the name could have had no scientific value if it had been expressed only in English. In that language it would have been unintelligible to nine-tenths of the scientific world. Hence, Agassiz named his newly-found wonder in Greek, the common language of science for such purposes, the world over. From the two Greek words, *πτερον*, a wing, and *ιχθυς*, a fish, he formed the name of *PTERICHTHYS*, the wing-fish; and, by this name, the group is henceforth known in every land, and by every naturalist throughout the world.

The two thousand species of fish which the same great observer has recently brought from the Amazon river, will in due time be made in like manner accessible to naturalists. Each will have its double name, describing at once the genus to which it belongs, and the peculiarity which distinguishes it from the other species of that genus. These names, too, will be expressed, not in the barbarous dialect of the rude Indian tribes within whose limits the species were found, nor in the Portuguese of their Christian masters, nor in the native French of the great explorer of the valley of the Amazon, nor yet in the English of the country which sent forth the expedition, but in the languages which are common to science in all lands, and which must endure unchanged through all the remaining ages of history—names vivid in their descriptive picturing, brief for familiar use, equally intelligible in every school of science in the world, and pronouncable by every tongue throughout the area of civilization.

Now it is obvious that if all scientific names are in Latin and Greek, any person who is to become acquainted with science should possess some knowledge of those languages. It may not be an intimate and familiar acquaintance, and may not embrace an exact and precise knowledge of the refinements of speech, but some knowledge of the vocabulary, particularly of the Latin, is clearly indispensable to a student of science. Without it he cannot know

the meaning of the names he is daily uttering, and cannot write them with any certainty that he is accurate; while if he becomes himself a discoverer of species, he is unable to describe them by any suitable names, and must see the honor of naming his own discoveries snatched from him by another. If he becomes eminent enough to attempt to give instruction by lectures, he must continually present himself before his audience in the pitiable position of one who knows not the origin or the explanation of the names he is uttering; and who fears to commit a blunder in pronunciation as often as he opens his lips. A most eminent geologist of our own State, who has immortalized himself by bringing to light the thousands of fossils of the Silurian deposits of New York, experienced the disadvantage of this want of early preparation, and was obliged to supply the deficiency by learning the elements of Latin and Greek in the maturer years, and amid the active investigations of later life, in order to give names to the discoveries which he had made.

Nor is it only the nomenclature of its classification which these languages contribute to science. As investigation advances, facts of a deeper kind come to view. Extended analogies begin to be observed, for which the common speech has no name; important generalizations are formed which call for accurate expression, and this expression again needs to be made the common possession of the scientific men who have to make use of it. It has been ascertained by Owen, for instance, that the fundamental type of construction for the whole great group of vertebrate animals, is *the vertebra*; and a scientific description of this important element becomes essential. It is given by the philosophic and learned discoverer in the following words:

"It consists in its typical completeness of the following parts or elements; a body, or *centrum*; two *neurapophyses*, two *parapophyses*, two *pleurapophyses*, two *hæmapophyses*, a *neural* spine, and a *hæmal* spine. These being usually developed from distinct and independent centres, I have termed *autogenous* elements. Other parts more properly called 'processes' which shoot out as continuations from some of the preceding elements, are termed *exogenous*; e. g., the *diapophyses* or 'upper transverse processes,' and the *zygapophyses* or the 'oblique' or 'articular' processes of human anatomy." (Lectures on Comparative Anatomy, Part I, page 43.)

It is obvious that the scientific style of our language must, with

the progress of philosophical views of nature, go more and more to this abstruse and recondite habit of expression. The tendency is strikingly exhibited in the writings of the author just quoted, who affords certainly the most extraordinary example in our language, and perhaps in any other, of the union of precision with comprehensiveness and breath. Many sentences might be quoted from his writings, remarkable for concise and lucid accuracy of statement, which yet from their free use of those Greek compounds which enable the writer to compress into a perfectly definite word a whole comprehensive generalization, are almost unintelligible to the mere general reader.

Indeed, it is curious to imagine what would have been the position of the scientific world at the present day, without those cultivated languages of antiquity to afford the means for the expression of its thought, and for the perfection of its systematic nomenclature. One is positively frightened to think where we should have been by this time, if, by the want of any more generally current medium one hundred and fifty years ago, Linnæus had been compelled to name his wide and comprehensive enumeration of species in every department of nature, in his vernacular Swedish; Buffon, half a century later, to designate his vast array of added species, in his native French; the great English and American explorers of Australia and the Pacific, to name their discoveries in our mother tongue; the more recent and learned naturalists of Germany, to describe the results of their profound researches in German gutturals; the Dutch investigators of Java and Borneo, to employ their familiar language of Holland, and the Russian student of nature to use his own tongue, so difficult to outsiders, to furnish names for the plants of Siberia and the Ural. In such a state of things, science would be only another Babel. We should see mankind toiling through generations to build the loftiest structure that human hands had ever reared, and perpetually baffled by its own inevitable reproduction of the original judgment—a confusion of tongues.

It is truly one of the marvels of Divine Providence—for we may be sure it is no accident—that, amid the wide diversities of speech in modern christendom, these two noble languages of antiquity should have come down to us as the common heritage of the nations; if not to serve for the personal intercourse of scientific men, yet to supply to science the descriptive terms of its elegant nomenclature, to afford names for the designation of its innumer-

able species, to furnish the compound words which express its wide generalizations, and thus to form its very language through the ages of its future development.

For these reasons a certain knowledge of the classical languages has become in our day an indispensable element of scientific education for every student of Natural History. The observer who analyzes a flower from the woods, or who makes a collection of shells from the beach, or who raises butterflies or moths from the cocoon, must, if he or she is ever to gain real possession of any one of these departments, or give any scientific value to such researches, be imbued with some tincture of classical learning; while the student who would even follow, with any true intelligence, the progress of scientific discussion, will find his way painfully obstructed without some such attainment.

II. Another very important aspect of this subject is found in the peculiar philological position of the classical tongues.

1. Together with our own, and with most of the languages of modern Europe, they form the great group known as that of the Indo-European languages. The members of that family are connected by many points of identity, which demonstrate their common derivation from one original and central stock in the seat of the world's earliest civilization. Among all these languages the Latin stands forth conspicuous by the singular perfection of its grammatical structure. The system of inflections is, in it, carried out with a regularity and completeness unknown in any other member of the family, unless it be the ancient Sanscrit. It affords, therefore, the very best accessible model for the study of philology. Whoever would cultivate an acquaintance with the science of language in general, will find ampler material for his researches here, than perhaps in any other available form of human speech.

2. If this consideration should seem somewhat far-fetched in itself, it is by no means so in its immediate application.

The Latin language does not stand alone in the world, an isolated and disconnected fact. The old speech of Rome is the basis of the languages of half the population of Europe; and those, with the single exception (besides our own) of the German, by far the most important. It is the basis of the French, so long the language of refinement and taste in books, and of the intercourse of all the courts and drawing-rooms, and all the polite society of Europe. It is still more the foundation of the Italian, the earliest in culture and development of the modern tongues,

and the language of music and the fine arts. It has given character to the Spanish and the Portuguese—the languages of those energetic nations which, when emancipated from those Bourbon dynasties, that learn nothing and forget nothing, will yet vindicate their claim to be the children of those who first carried empire literally around the globe.

To all these tongues the Latin stands in the most intimate relation, and the mastery of it is, in great part, the mastery of them. The student who is familiar with its grammatical forms, and its vocabulary, has learned so much of the structure of the others, that we may quote the high authority of Mr. John Stuart Mill, in his recent inaugural address, for the assertion that “the possession of it makes it easier to learn four or five of the continental languages than it would be to learn one of them without it.” Surely the language which affords the best key to general philology, and which renders most of the languages of modern Europe five fold easier of acquisition than they would otherwise be, has a claim to a prominent place in any general scheme of education.

3. Still further, the relation of the Latin tongue to our own, commends it as an object worthy of attention.

It is in great part the basis of our own familiar speech. Not, indeed, in the more simple and every day affairs of life is this the case, for in this department the Anglo-Saxon supplies those vivid, homely and significant forms of expression which gives it so much of the beauty of simplicity, and of strength. But there is another side to our language, and this is almost wholly of Latin origin, which embraces all our language of philosophical discussion. All our metaphysics, and all our morals, are in expression essentially Greek or Roman. If we give utterance to our feelings as matters of personal experience, we pour forth our love or our hate, our envy or our fear, in the simple Saxon of our childhood; but the moment that we begin to moralize, or to philosophize—that is, to reflect, we speak of sensations, emotions, sentiments, passions, impulses, and all these words are of Latin origin. The tendency to use these more abstract forms of statement has somewhat declined among us since the great authority of Dr. Johnson gave them such general currency in the last century; but no one can become familiar with Johnson’s precise and weighty style of speech, without being sensible of its extraordinary force. It is not too much to say that his writings gave the British public a new view of the capabilities of their language; and that since his day it has been



generally written with an exactness, a finish, and a power, of which there were very few previous examples in our literature. At present, this side of our English, though not unduly predominant, has a very wide acceptance among good writers; and even those who, like Paley for instance, possess a perfect mastery over all the simplicities of Saxon speech, feel themselves called, as he did, to a frequent use of very elaborate Latin constructions of phrase.

It is this union of widely different elements in the English tongue which forms one of its distinguishing excellencies, and no one can acquire the full command of the resources of our vernacular, without a tolerable familiarity with this great source of its strength—save, indeed, as some extraordinary ability may in rare instances supply the place of it.

To the same peculiarities of the Latin as a highly inflected language, is due that power of inversion of the parts of a sentence which forms so remarkable a feature of the style of the great writers of antiquity. As the form of each word indicated its place in the sentence, they were enabled to combine words with a freedom of which we have scarcely any other example. They studied the artistic construction of their sentences with the utmost care, and they carried this element of beauty and effect to a degree not attained in any other languages, and which has made their works the models for all subsequent ages. This freedom of adjustment none of our modern tongues has retained in any similar degree. The irregular and somewhat lawless style of the English has allowed us more of it than most others possess. We can place the predicate first, and invert the principal members of the sentence whenever it becomes necessary for the expression of emotion. The French language, on the other hand, has, like the other subjects of the Emperor, entirely lost its liberty of utterance, and is confined to a single and invariable order, in which the subject is always placed first. The French critics seem rather to glory in this peculiarity, as the proper character of a language of pure reason. "French Syntax is incorruptible," they say; no impulse of passion may disturb the orderly sequence of thought in that tongue. But so long as language shall have for its function the full expression of the human heart, so long will it be indispensable to find the means of adequately expressing emotion.

For this purpose the study of the classical authors is our great means of discipline. They present to us models of expression which are not to be found elsewhere. Indeed, the modern mind

has passed the point at which it is possible for any similar models to be produced. It is rich with varied emotions, comprehensive of many forms of thought, and deep in the experience of sentiments unknown to the ancients; and it has no time to elaborate those perfect forms of narration and statement which give such a charm to the more narrow and limited elegance of ancient days. But while the breadth of our thought and the depth of our sentiment so far surpass anything that the ancients knew, their graceful and beautiful forms of expression must long afford the most exquisite models by which to discipline the taste of our richer, stronger and profounder age.

That these are not merely theoretical advantages may be inferred from the fact that a serious practical necessity of such linguistic culture is already beginning to be felt, even in quarters which it might be supposed would be entirely exempt from it. In the departments recently organized, for example, in some of our best colleges, for mechanical and scientific studies, there is found to exist among the students a great inaptitude, both for the acquisition of those modern languages by means of which such studies must be prosecuted, and for the ready and effective command of the English. So seriously have these difficulties been felt, that the Scientific Faculty of one of the very highest of these institutions (I refer to the scientific school in Yale College), strongly recommends to all its pupils a preliminary discipline in Latin; and has even been forced to consider the propriety of making such a discipline an indispensable qualification for admission to the school.

Nor are we at liberty in such a general summary to overlook the fact, that it is in one of these philosophical and elegant forms of human speech that the Almighty Father has been pleased to embody his highest and noblest communications to man. In it He has seen fit to record the history and the instructions of the world's great Teacher in the way of life,—the death which forms both the sublimest and the most important event in the world's history, through all the past,—and the Resurrection, which both for each individual man, and for the race at large, most illumines and gilds the future. Were it in some barbarous jargon that these grand disclosures had been embalmed—in some obscure and rude speech, the study of which could add nothing to our intellectual wealth, and contribute nothing to elegance and refinement—it would still seem both ungrateful and unhappy, perhaps also

unwise and unsafe, to divorce our systems of education from the studies which contain the world's great means of moral culture. But how striking, on the other hand, is that providential design which has consigned the teachings of Christ to that language which, by the concession of all scholars, is certainly the most philosophical, and perhaps also the most elegant of all the forms of human speech ! It seems as though He had designed that the reverent study of His great revelation should not only imbue the mind with religious knowledge, but impart to it also something of the best results of human culture and refinement. It is certainly not without design that the vehicle of the world's religion stands so closely related to its philosophy and its science. The education which teaches us God, teaches us also what is best and noblest in man; as the elevation which raises us nearest to Heaven shows us most truly and largely the earth.

It would seem, then, that the classical languages must ever occupy an important place in every institution of enlarged education. They are indispensable to any scientific knowledge of nature; they afford our best preparation for the acquisition of the cultivated languages, and of general philology; they enter largely into the constitution of our mother tongue; they afford us by far the best models of style; they supply our language of taste and elegance on the one side, and of philosophy and morals on the other; and they embody the spiritual treasures of God's revelation to man. In various degrees they mingle themselves with all the recent culture, as they stand related to all the early history of mankind. It will always be difficult, but it is at present quite impossible to devise means which could at all supply their place in education.

## VOLUNTARY ENDOWMENTS OF COLLEGES AND ACADEMIES.

BY JOHN V. L. PRUYN, LL. D.

*Chancellor of the University of the State of New York.*

The Executive Committee of the University Convocation, at a meeting held in March, 1867, assigned the subject of " Voluntary Endowments of Academies " to a special committee, consisting of the Chancellor and the Secretary of the Board of Regents and Prof. Upson, of Hamilton college, to be reported upon at the next meeting of the University Convocation, to be held in August of that year. At that meeting, the Chancellor, as chairman of the committee, made a report in part, which he was requested to perfect for publication in the convocation proceedings, using his discretion as to the extent of the discussion. That publication having been much delayed, this report, in its present form, was not prepared until July, 1868.

Nearly all the colleges and academies of this State have been founded, and many of them aided in their subsequent growth, by private contributions; and there is evidence of a growing disposition on the part of wealthy citizens to make liberal donations for the establishment and support of such institutions. The extent to which this liberality is exercised, depends in a measure upon efforts to awaken a special interest in higher education, and upon personal appeals to the wealthy to apply their means in this direction. In some cases, the success of such appeals may depend rather upon incidental circumstances than upon the claims which education as such presents. The proximity of an academy, and the fact that a given sum goes much further towards endowing an academy than a college, may incline many persons to bestow their educational gifts upon the former. Be this as it may, the opportunities are ample for aiding either colleges or academies, and it concerns the friends of education not so much to urge the claims of this or that institution or class of institutions, as to forestall objections and remove obstacles to liberal endowments for the benefit of higher education.

When the State is doing so much for popular instruction, the question arises whether it does not belong to it rather than to indi-

viduals to furnish all the means of education, from the common school to the university.

All doubtless agree that the founders of new States should set apart ample portions of the public domain, for the benefit of education in all its departments. This policy, to a very inadequate extent, was adopted in the early history of the State, it being provided by an act passed March 23, 1782, that "whenever any persons entitled to lands by virtue of this act,\* shall associate in a sufficient number to take a whole township of seven miles square," \* \* "in every such township there shall be laid out one lot containing four hundred acres, for the support of the gospel; and two other lots containing each two hundred acres, for the use of schools; and if any number of acres less than the least right shall remain, they shall in like manner be appropriated to the use of schools."† It was also provided by an act passed May 5, 1786, entitled "*An act for the speedy sale of the unappropriated lands within this State, and for other purposes therein mentioned*," "that in every township so laid out, or to be laid out as aforesaid, the Surveyor-General shall mark one lot on the map, *gospel and schools*, and one other lot, *for promoting literature*, which lots shall be as nearly central in every township as may be; and the lots so marked shall not be sold, but the lot marked, *gospel and schools*, shall be reserved for and applied to promoting the gospel and a public school or schools in such township; and the lot marked, *for promoting literature*, shall be reserved to the people of this State, to be hereafter applied by the Legislature for promoting literature in this State."‡ Authority to sell these lands for the benefit of education, was subsequently given by the Legislature, and from this source, in part, the common school and the literature funds of the State have originated; both, however, have been much increased from other sources, though both are still inadequate to the support of the classes of institutions to which they are respectively devoted; and it is now too late to make either of them materially larger from any such source as that from which they were originally derived.

The deficiency in the income of the common school fund is now made up by direct taxation, to which, in view of the advantages

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\* Referring to certain military bounty lands.

† Greenleaf's Statutes, vol. I, p. 49.

‡ Greenleaf's Statutes, vol. I, p. 282.

of free education, the people cheerfully assent. While it is universally conceded that every child within the State should be thus provided with such an education as will prepare him for ordinary business and for an intelligent discharge of his duties as a citizen, it is questionable whether it is the duty of the State, as such, to extend further its provisions for education; and whether it does not rather accord with a well established and approved policy, to encourage and invite citizens of wealth to supplement the bounty of the State, by providing ample endowments for higher institutions of learning. The objection that this tends unduly to increase the number of colleges and academies, and thus to weaken those supported wholly or in part by the public, would be entitled to much consideration, did it not appear that even in those States which, like Michigan, provide a complete and free system of education, independent schools and colleges are springing up. While the establishment of too many institutions is to be deprecated, there is reason to believe that both colleges and academies, founded by private endowments, will exist and thrive in spite of all obstacles, and that the mutual influence and competition of these rival systems (if such they are regarded), will tend to elevate the standard of both.

Assuming, therefore, the continued existence of colleges and academies founded by private munificence, we must make them as useful as possible, by providing such endowments as will relieve them from being dependent on fluctuating patronage for their support, and enable them to furnish the best facilities, either without charge or at very reasonable rates.

In accordance with these views, it is believed that this State, which has always exercised, to some extent, a supervision over all incorporated institutions of learning, should take measures to facilitate and encourage their full endowment, under such restrictions as may be deemed proper for the general good. Experience has shown that further legislation is needed for the investment and protection of such endowments, and to guard against their diversion and misapplication.

The draft of an act for this purpose, entitled "An act to encourage endowments for public, charitable, literary and other purposes," was prepared by the chairman of the convocation committee on endowments above referred to, during the session of 1867. The bill was introduced into the Senate on the 15th of March of that year, by Mr. White, now president of the Cornell University, and

having had two successive readings, was referred to the committee on the judiciary.\* On the 18th day of April following, Mr. Folger, from the judiciary committee, reported in favor of the passage of the bill, and it was referred to the committee of the whole,† but was not subsequently taken up, on account of the final adjournment of the Legislature two days afterwards.

As this bill, though it failed to become a law, was favorably reported upon, there is reason to hope that its passage, or that of some other of like character, may hereafter be secured. As the provisions of the bill may interest the friends of education, a copy of it is hereto appended, and suggestions in regard to it are invited and may be addressed to the Secretary of the Board of Regents.

During the session of the late convention for revising the Constitution, in accordance with a resolution adopted by the University Convocation, on the 7th day of August, 1867,‡ this subject was presented to the standing committee on education, and the following clause was inserted by the committee in the draft of the article reported to the convention :

SEC. 3. The Legislature may provide for the payment into the treasury of money or securities for the general or special endowment of any literary or educational institution in this State; for the investment of the same, and for the payment of the interest upon said investment in accordance with the terms of the endowment as approved by the Legislature.

The section was struck out by the convention, for the reason that it was not considered necessary to incorporate this provision into the fundamental law, the Legislature being competent, in the judgment of the convention, to provide for the case without any express grant of power for the purpose.

In their annual report to the Legislature, communicated February 28, 1868, the Regents earnestly renewed their former recommendation on this subject. With an enactment for this purpose, wisely framed, it is believed that endowments will increase much more rapidly than hitherto in the history of the State.

It is encouraging to consider what has already been accomplished in this direction, notwithstanding the want of adequate provision by law for the protection of the funds contributed for endowments.

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\* Senate Journal of 1867, page 380.

† Senate Journal of 1867, page 1004.

‡ See page 10.

The incorporated colleges of the State (exclusive of the Cornell University), are found by reference to their last annual reports\* to be possessed of productive capital amounting to almost four millions of dollars, held by the several colleges as follows :

	Productive endowments.	Actual income from interest, tuition, &c.
Columbia College.....	\$2,356,522	\$151,730
Union College.....	361,932	19,740
Hamilton College.....	158,700	14,452
Hobart College.....	154,329	11,216
University of the City of New York	171,000	29,991
Madison University .....	180,190	18,875
St. John's College.....	Not stated.	Not stated.
Genesee College.....	123,787	10,776
University of Rochester.....	167,918	15,307
Elmira Female College.....	9,500	21,718
St. Lawrence University.....	24,413	4,222
Alfred University.....	74,800	6,617
Ingham University.....	None.	13,674
St. Stephen's College.....	None.	13,000
College of St. Francis Xavier....	Not stated.	Not stated.
Vassar College .....	Not stated.	82,068
Manhattan College .....	None.	Not stated.
College of the City of New York.	38,500	Tuition free.
Rutgers Female College .....	20,000	1,400
	<u>\$3,841,591</u>	<u>\$414,786</u>

The following academies, as appears from their last annual reports, hold productive funds, mostly in the form of bonds and mortgages, or United States stocks :

Academy of Dutchess County.....	\$700
Albany Academy .....	2,600
Ames Academy.....	200
Buffalo Female Academy.....	500
Canandaigua Academy.....	12,500
Cary Collegiate Seminary.....	20,000
Cayuga Lake Academy.....	6,000
Chamberlain Institute.....	45,000
Clinton Liberal Institute.....	7,500

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\* Contained in Regents' Report for 1868.



Cortland Academy.....	\$2,450
Delaware Academy .....	4,825
Erasmus Hall Academy.....	7,000
Evans Academy .....	15,000
Franklin Academy, (Malone) .....	3,000
Friends' Academy.....	500
Genesee and Wyoming Seminary.....	2,200
Geneseo Academy.....	10,000
Gilbertsville Academy.....	2,500
Hartwick Seminary .....	18,000
Hungerford Collegiate Institute.....	10,425
Ithaca Academy .....	6,300
Kingston Academy.....	5,000
Lansingburgh Academy.....	5,500
Mexico Academy .....	575
Middlebury Academy.....	3,500
Munro Collegiate Institute.....	9,000
Onondaga Academy.....	1,600
Oxford Academy.....	2,100
Pike Seminary .....	<del>500</del>
Pompey Academy.....	1,420
Seneca Falls Academy.....	2,800
S. S. Seward Institute.....	20,000
Walworth Academy.....	800
Whitestown Seminary.....	1,000
<b>Total .....</b>	<b>\$230,995</b>

In addition to the above, the Ten Broeck Free Academy, at Franklinville, Cattaraugus county, which has not yet reported to the Regents, has recently gone into operation with a permanent endowment said to amount to about seventy-five thousand dollars, being the proceeds of a bequest by the late Hon. Peter Ten Broeck.

Another instance of commendable liberality is that of Dr. Jared Parker, of Clarence, Erie county, who has provided for the free instruction of all academic scholars in the Clarence Academy.

It thus appears that thirty-five academies of the State have aggregate productive endowments to the amount of more than three hundred thousand dollars. From recent indications on the part of citizens in various parts of the State, it is believed that with proper exertions and the favorable influence of a law such as that

above referred to, these endowments may in a few years be very largely increased.

It may be useful to include in this report a statement as to the character and extent of the endowments of leading institutions outside of the State. For this purpose the University of Cambridge (England), Harvard and Yale Colleges, and the University of Michigan, have been selected.

#### CAMBRIDGE UNIVERSITY.

The extent to which the Universities of England are indebted to endowments by private individuals is, in this connection, every way worthy of consideration.

We select a single one, that of Cambridge, for the purpose of presenting detailed statements regarding these endowments, which serve to illustrate what is probably true, in an equal degree, of Oxford, and measurably of the other Universities of the Kingdom.

The University of Cambridge is composed of seventeen distinct institutions, called colleges, each one having its independent charter of incorporation, and rules and regulations peculiar to itself. They are all, however, controlled by the general statutes of the University.

Thirteen of these seventeen colleges owe their origin to the benevolent zeal of private individuals. Each of them, since the foundation of the oldest, that of St. Peter's, six hundred years since, has had continual additions made to its means of advancing the interests of higher education, from similar sources.

The forms which these endowments assume for the benefit of the college, after the expenditure for buildings has been provided for, are mainly the following :

1. An income is provided for the heads and officers of the colleges, from permanent funds. The salary of the heads of colleges, besides rooms and board, averages for each one a thousand dollars a year.

2. The number of fellowships provided in all the colleges for those who are graduates of the University, amounts to three hundred and eighty-five. The fellows are provided with rooms and board, and receive a fixed annual stipend for a period reaching from ten years to the end of their lives. This stipend is in amount from five hundred to twenty-five hundred dollars a year. The original intention of a fellowship was to assist clerical students through

an academical and theological course of study of from ten to fifteen years in length, but the plan, as now extended, secures the gratuitous support for life of a learned class of graduates in the prosecution of study.

3. There are, in the seventeen colleges, at least 472 scholarships for undergraduates, who, in many cases, receive their board and room-rent free, and in addition from one hundred to four hundred dollars a year for their expenses, from funds invested by donors for the specific purpose. Besides these, there are what are called minor scholarships, which are available for students who have not had time to pass an examination for a foundation scholarship. The amount set apart by St. John's College alone every year for its scholarships is thirty-three thousand five hundred dollars, besides giving two thousand dollars to deserving students.

4. From similar endowments, each college is usually able to give free board and other emoluments to poor students or sizars.

5. Besides these foundation scholarships, with the succession of years there have been attached to each college, by individual donations, scholarships bearing the names given by their founders, and designed for a limited competition, as by the students of particular schools like Eton and Harrow, or for students in specified branches of study, the classics, Hebrew, mathematics, law, etc., or as rewards for good examinations. The value of these scholarships is on an average equal to that of the other scholarships. They amount to more than one hundred in number.

6. Numerous and frequently valuable prizes are annually offered for excellence in study and exhibition of talent, which have been provided by benevolent individuals who make the college of their preference the trustee of a small capital to be invested for the purpose. The prizes are awarded after competition before examiners. Although the prizes are frequently only a set of books or a gold medal, they are more frequently in money, and are of the value of from twenty-five to one hundred dollars. The whole number of these prizes is also considerable.

The larger proportion of these endowments are designated after the names of their founders. This is the origin of the names of thirteen of the colleges, as Pembroke, Margaret, and the like. A large number of the foundation scholarships, the special scholarships, the exhibitions for particular schools, and the prizes, are called after the names of the individuals who established them, or after the name of some person whom the donors wished to honor

with a permanent remembrancer. The University Calendar annually reports the name and income of each scholarship, frequently the series of names of those students who have enjoyed its privileges, and always the names of the persons who received the prizes of the preceding academical year.

The income of these seventeen colleges is derived from investments in the consolidated funds of the Government (consols,) from landed estates, from tithe impropriations, etc.; and the portion of this income which pays the salaries of the heads of the colleges, the stipends for fellowships and scholarships, thirty years since amounted to the annual sum of five hundred and eighty-two thousand dollars. This does not include the income of the college or of individuals for tuition money or rent of rooms.

The preceding remarks refer solely to the endowments of the separate colleges. When we come to the endowments by individuals for the University proper, we find that although they have not been as large, they still have been of great importance for the end in view, that of thoroughly educating the higher students of the Kingdom.

Of the thirty University professorships, seventeen were established by private beneficence, and twelve of them are designated by the names of their founders, or of persons eminent for learning in whose honor they were created.

The scholarships of the University are not so numerous. There are thirty-four only which can be enjoyed by their recipients, usually after competition for a period of from three to ten years. The average income of each is three hundred dollars a year. They are all named from their founders.

The University prizes are in addition to the college prizes. The number of annual prizes in the form of gold medals, or of money, offered by the University for excellence in classical studies, in the mathematics, or some branch of literature or science, is at least thirty-six. The money value of these prizes varies from twenty-five to two hundred dollars. They are also designated by the names of their founders.

The amount of money for prizes alone annually distributed in the colleges and the University, amounts to the sum of eleven thousand five hundred dollars.

There are also endowments for the expenses of certain annual sermons on specific subjects, and also for lectures on some branch of science. One thousand dollars a year was charged upon an

entailed estate by a benefactor, for the purpose of enabling two graduates annually to receive five hundred dollars each, towards their expenses in traveling and making investigations in foreign countries. Another donor has provided a fund yielding fifteen hundred dollars a year, for the care of sick students.

But the libraries and museums connected with the University more expressively attest the readiness with which responses have been made by citizens to the demands of education. The botanic garden, the astronomical observatory, the geological museum, the museum of comparative anatomy, and the Fitzwilliam museum of paintings and sculpture, were all founded by individuals, and continue to receive contributions from private persons, as do also the library with its two hundred thousand volumes, the botanical museum and the museum of zoology, which three institutions were originally founded by royal bounty.

The income of the University proper, for general purposes, is small, and is chiefly derived from fees paid by the students or from profits of the University printing house, a building erected as a monument to William Pitt and designated by his name.

The University funds are administered by the vice-chancellor or by special trustees; the accounts are annually examined by three auditors who are appointed by the Senate of the University. The officers and servants of the University are paid from the University chest.

The sum total of the annual income of Cambridge University and of its seventeen colleges, thirty years since, as far as statistics were obtainable, was shown to be not less than seven hundred and fifteen thousand dollars.

The annual income of Oxford University at the same period was still larger, amounting to the sum of eight hundred and seventy-five thousand dollars.

The whole income of the nine remaining universities in England, Scotland and Ireland, not counting those which have no university relations, amounted to about five hundred thousand dollars a year.

This is a condensed and comprehensive sketch of the endowments of a single university, illustrating how much good may be done through a series of many centuries, by acts of private munificence directed to a specified end. It is well that the knowledge of the names of these donors should be perpetuated, by being forever associated with the endowments they created.

## HARVARD COLLEGE.

Harvard College possesses property (besides its grounds, college halls and buildings, with their contents), estimated by the treasurer to be worth \$2,100,000. This property consists of bonds, stocks, mortgages and real estate, and yields an annual income for the expenses of the University of more than \$130,000. To this must be added an income of about \$60,000, from students of all grades and classes for tuition, room rent, etc. The total annual expenditure for salaries, scholarships, and the support of all the institutions of the College, amounts to the sum of \$185,000.

These endowments are chiefly the result of the beneficence of private individuals.

Of the forty-four professorships, twenty-four bear the names of the individuals who founded them, or in whose honor they were designated. Other professorships were established by subscriptions.

Of scholarships there are forty-four, most of which have been created within the last ten years, and bear the names of their founders. Their value is from one hundred to three hundred dollars a year. They are only awarded to those who are at the same time high scholars and needy.

There are in all thirty prizes for excellence in scholarship, viz.: five prizes of thirty, forty or fifty dollars for the best English dissertation; two of thirty-five dollars for excellence in Greek or Latin composition; five of ten and fifteen dollars for elocution; thirteen of from ten to forty dollars to the different classes for excellence in reading English prose. The remaining five prizes are in the law and medical schools. There are thirty-four prizes in the form of books, for the most part designated by the names of the persons who instituted them.

The sum of twenty-six hundred dollars is annually disposed of to indigent students, either by gift or loan.

By means of endowments of deceased and living benefactors, provision is made for the expenses and support of the library, the astronomical observatory, the zoological museum, the botanic garden, and the collection of engravings. The alcoves of the library are adorned with the names of the most prominent donors of books. At least ten of the halls and other edifices of the University are named after those who made the most liberal contributions to their erection. The names of all donors are

recorded in the great book of benefactions. Most of these endowments, being made for specific objects, do not diminish the expenses of the student, however largely they enhance the value of his education. The University is consequently in need of more ample means to meet its general expenses, which are constantly increasing. The income of the endowments for many of the professorships is now insufficient, and for the support of some professors there is no endowment, and the under-graduate students are subjected to charges for instruction, rent of rooms, etc., amounting to at least one hundred and thirty-four dollars a year.

In a late report (1867) the treasurer observes: "The College has not the means to meet its expenses not specially provided for by endowments \* \* \* from its portion of its general investments and its receipts from students, and it is absolutely necessary either that the expenses should be reduced, or means for their support provided."

#### YALE COLLEGE.

The condition of the funds of this University is presented summarily in a communication recently made by its treasurer, which we copy with some abbreviations :

#### I. *In the Academical Department.*

##### 1. Professorships endowed to the amounts stated:

Divinity.....	\$43,443 65
Modern languages .....	31,330 64
Moral philosophy and metaphysics.....	20,000 00
Natural philosophy.....	15,000 00
Natural history.....	10,486 25
Law.....	6,500 00

##### 2. Funds for scholarships or prizes:

Family scholarships.....	\$24,166 66
General scholarships.....	44,811 15
Undergraduate scholarships.....	9,666 66
Graduate scholarships.....	6,800 00

##### 3. Library funds .....

\$26,837 33

##### 4. Miscellaneous funds:

Musical instruction.....	\$10,000 00
To promote the interests of religion.....	500 00

5. Accumulating funds, the income of which is not available at present, but is added to the principal:

Building funds .....	\$168,975 41
Graduate scholarship fund.....	6,367 36
Fund for a new unnamed professorship .....	6,361 32

6. General fund, the income of which may be used for any collegiate purpose....	\$356,619 92
Unproductive real estate deducted... ..	65,173 87

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\$291,446 05

II. *In the Theological Department.*

General fund.....	\$187,038 64
Library fund.....	1,269 71
Scholarship fund .....	28,000 00

III. *In the Medical Department.*

General fund.....	\$12,234 73
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IV. *In the Philosophical Department.*

General fund.....	\$62,975 00
Library fund... ..	10,000 00
Benner fund, for agricultural museum.....	300 00

Other professorships.

Sanskrit professorship .....	\$12,000 00
Botany professorship.....	23,000 00

The productive funds above stated amount to \$1,170,310.56, irrespective of the college grounds and of the college building and library, museums and furniture.

There are twenty-six professorships, eight of which are named after benefactors of the College. Only one of the professorships, however, has an endowment moderately sufficient for the support of a family.

There are seventeen scholarships, nearly all of small amount, viz.: six of one hundred dollars, and twelve of sixty dollars, for needy students; four for excellence in studies, of forty-six, sixty, ninety and one hundred and twenty dollars respectively. By an income (\$2,800) from charity funds, instruction fees are remitted to about seventy students. There are twelve scholarships of eighty dollars each in the Divinity school. The State of Connecticut provides free tuition scholarships for a certain number of pupils from each county of the State in the Scientific school.



There are five prizes of twelve dollars each for the best English composition of seniors, and one of one hundred dollars to seniors for the best English oration. There are also some smaller prizes.

The accumulating funds for specific objects do not add anything to the means available for the support of the institution; the general fund has not been sufficient to bear the increased high rate of expenses in all departments, and the charge for tuition has been raised to sixty dollars a year. Still, with all the combinations made, the treasurer states that it "leaves less than enough for the necessary miscellaneous expenses of the institution, with no provision for extraordinary wants or for further growth and development."

#### MICHIGAN UNIVERSITY.

The University fund, permanently invested at seven per cent., is officially stated to have been, on the 30th of November, 1867, \$557,833. This fund was derived from the sale of the University lands granted by the General Government, amounting to 48,000 acres, which have yielded an average of about ten dollars per acre.

By an act of the Legislature, a tax of one-twentieth of a mill has been imposed upon the taxable property of the State for the benefit of the University, amounting for the last year to \$15,398.30. This amount, however, cannot be claimed by the University, except upon conditions such as the Regents have not as yet felt at liberty to comply with.

The estimated expenses for the current year are in excess of the income by several thousand dollars, unless the amount raised by tax can be made available. The University endowment has already become inadequate, and needs to be increased from either public or private sources.

#### APPENDIX.

(Referred to on pages 123 and 124.)

#### AN ACT to encourage and protect endowments for public, charitable, literary and other purposes.

*The People of the State of New York, represented in Senate and Assembly, do enact as follows :*

SECTION 1. Any person who may desire to give or contribute any sum of money, not less than five hundred dollars, by way of endowment for, or in aid of any of the objects or purposes mentioned in the act entitled "An act authorizing certain trusts," passed

May 14, 1840, or for any religious, charitable, benevolent or scientific object or purpose, or to promote the study and pursuit of art, or to found a library or museum, or in any way to promote the common good, may present an application in writing to any justice of the Supreme Court, setting forth his intention to make such gift or endowment, and the amount thereof, the object or purpose to or for which the same and the interest thereof is to be used or applied; the terms and conditions thereof, with all proper particulars in regard thereto, which application shall be verified and acknowledged to the satisfaction of the said justice by the party signing the same (or his duly authorized attorney).

§ 2. The said justice, if satisfied that the object and purpose of the said proposed endowment or gift is not in conflict with any law of this State, and that such application is in the form hereby required, shall so certify on the said application, and shall also specifically and clearly order and direct when and to whom and on whose draft, voucher or order, and on what terms the income or interest of the said fund, as hereinafter provided for, shall be paid, with all necessary instructions in regard to such payment. Such order may at any time thereafter be changed or modified by any such justice on hearing the parties in interest; but no change or modification shall conflict with the terms and conditions of the original gift or endowment, unless with the consent of the original donor and of all parties in interest.

§ 3. The said application, with the certificate and order first above mentioned endorsed thereon as aforesaid, shall be filed with the Comptroller of this State, who shall thereupon issue an order or warrant authorizing the party who made the said application to deposit the sum named therein as the amount of such proposed gift or endowment, with the Treasurer of this State; and the said Treasurer shall receive such amount accordingly and give his receipt therefor in duplicate, to be countersigned by the Comptroller; and thereafter the Treasurer shall, on the warrant of the Comptroller, pay from the treasury the interest on the amount so deposited, at the rate of seven per cent. per annum, at the time or times and in the manner and to the person or persons designated and directed in the order so made as aforesaid and endorsed on the said application.

§ 4. In case any party may wish, instead of paying or depositing cash in the treasury as aforesaid, to assign or transfer stocks or

bonds issued by the United States, or by this State, or by any county or municipality specially authorized by the Legislature to issue the same ; he shall state such wish in his application to be made as aforesaid, and, if approved by the justice to whom such application may be presented, the Comptroller shall receive such stock or bonds accordingly ; and the voucher which may be given by the Treasurer for such stocks or bonds shall describe the same fully. But the State shall not be held liable in any way for the payment or collection of any such stock or bonds, or the interest thereon, and the interest or income which may be collected on the same shall be paid over and applied in the manner which may be directed by the order made on the presentation of the said application as aforesaid ; and after the capital or principal, or any part thereof, of any such bonds shall have been paid into the State treasury, interest on any such sum or sums at the rate of seven per cent. per annum, as aforesaid, shall thenceforth be paid from the treasury in like manner as if cash had been deposited in the first place, to the party or parties and in the manner directed as aforesaid.

§ 5. In case the order made as aforesaid shall so direct, the capital or principal sum so deposited in the treasury shall eventually be paid by the Treasurer, on the warrant of the Comptroller, to such person or persons and on such terms as may have been so directed.

§ 6. If the party so making such deposit shall desire that the fund so deposited shall accumulate and no interest be paid thereon for a certain term of years, or until the happening of some contingency to be specified in the application to be made as aforesaid and in the order thereon ; such accumulation, at the rate of six per cent. per annum with annual rests, shall be made by the Treasurer of this State, but for a term not exceeding thirty years, and the amount of the original principal sum so deposited, with the interest so accumulated thereon, shall eventually be paid by the Treasurer, on the warrant of the Comptroller, in such manner as shall have been directed by the order aforesaid.

§ 7. The several amounts to be paid by the Treasurer, on the warrant of the Comptroller, pursuant to the provisions of this act. are hereby appropriated for that purpose.

## UNIVERSITY NECROLOGY.

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The following sketches of members of the University Convocation whose decease occurred during the year 1866-7, have been procured either from friends who have kindly furnished the same, or by compilation from such obituary articles as have come to the notice of the special committee appointed by the Convocation in 1867, of which Secretary WOOLWORTH was the chairman :

REV. JOSEPH RICHMOND BELLAMY, A. M., was born at Kingsbury, N. Y., October 23, 1833, and subsequently resided at Clyde until nearly of age. His father dying in 1852, he was left to mature his plans for life under an excellent mother's advice. The following year he removed to Newark, where he completed his preparation for college, his course of study being directed by his uncle, Rev. Daniel Bellamy. He entered the sophomore class in the University of Rochester, in the autumn of 1854, and graduated in due course in 1857. He immediately entered upon the study of theology, and graduated from the Theological Seminary at Rochester in 1859.

After preaching about a year, in consequence of weak lungs, he was led to engage in teaching. He spent several years in the Union school at Geneva, and in 1865 became principal of the Albion Academy, where his devotion and energy accomplished more for the institution, it is said, than any of his predecessors had done in so short a time. After spending a year and a term in the academy, he was attacked, during a class exercise, with a violent hemorrhage of the lungs, from which he rallied only enough to be removed to Newark, where, after lingering a few months, he died, July 11, 1866.

REV. PETER SMEALLIE, A. M., was a native of Princetown, Schenectady county, and a graduate of Union College in 1853. He immediately went to the State of Mississippi and engaged in teaching for one year. He afterwards took charge of the academy at Johnstown, in this State, where he labored faithfully and with

success for ten years. In the fall of 1864, he became principal of the Andes Collegiate Institute. Under his management this institution immediately revived and soon took its place among the most prosperous schools in that section of the State, more than two hundred students being in attendance at the time of his death. This occurred on the 4th of February, 1867, from congestion of the brain, after an illness of only twenty-four hours. He had met with his students on Sabbath evening for prayer, according to his custom, and had earnestly spoken to them of the value of the soul, the shortness of time, and the importance of preparation for sudden death. This was his last earthly work, and at nearly the same hour the next day he went to his reward. Although his energies were mainly devoted to teaching, he had also entered upon the work of the Gospel ministry, and had been largely useful in promoting the spiritual as well as the mental welfare of his pupils.

REV. BUEL A. SMITH, A. M., was at the time of his death, early in 1867, the principal of the Union Academy of Belleville, which enjoyed a large patronage during his administration. He was very active and energetic in his labors in that institution, until he was attacked with a cancerous disease, which progressed with great rapidity to a fatal termination. He visited the office of the Regents on his return from New York, whither he had been for medical advice, and where he had been assured that he could live but a short time. He expressed his entire acquiescence in the divine will in regard to this event, and calmly bade a final farewell as he started home to die. The next intelligence from that locality announced his decease.

MISS MARIETTA INGHAM was born in Saybrook, Conn., in the year 1800, and died at Le Roy in June, 1867. She early became desirous of promoting the cause of education, and engaged with great zeal in the training of a brother and her younger sisters, one of whom is the present Mrs. Emily E. Staunton, of the Ingham University. In the year 1835 she founded a school which was incorporated in 1852 as the Ingham Collegiate Institute, and which received a University charter from the Legislature in 1857. Though herself educated to but a limited extent, and possessed of a fragile physical organization, by her sagacity, energy, great executive ability and abiding trust in Providence, she conducted the affairs of the institution which she had founded, through all its vicissi-

tudes, with marked success, and bequeathed it to the cause of education as a rich inheritance, memorable for its past usefulness, and with abundant promise for the future.

REV. GEORGE KERR, LL. D., was born in or about the year 1815, in the northern part of Ireland, of Scottish ancestry. When he was nine years of age, his family emigrated to Canada, whence they removed first to Plattsburgh, then to Windham, and finally to Hunter, Greene county, in this State. Under the advice and encouragement of a few friends who took an interest in his welfare, he prepared to enter college, with a view of engaging in the work of the Gospel ministry. In 1835, he entered Williams College, and by the most rigid economy, he managed to graduate without any loss of time, at the head of his class. After graduating, he spent a year in teaching to get means to prosecute his professional studies. Having completed the course at the Union Theological Seminary in New York city, he preached a year in a rural parish in Schoharie county. In 1844, he accepted the charge of the Delaware Literary Institute, at Franklin, where he remained sixteen years. In 1860, he became professor of mathematics in the N. Y. State Agricultural College, at Ovid, and continued there until the closing of that college. He then spent two years as principal of the Jefferson County Institute, at Watertown, and the next two years at the Cooperstown Seminary. He had closed his labors there and was preparing to go again to Franklin, whither some twenty of his pupils had preceded him to finish their preparatory course for college under his private instruction, when he was suddenly prostrated by a lung disease, of which he died on the 27th of February, 1867, at the age of fifty-two years. He was buried at Franklin, greatly lamented by the community in whose midst he had spent the strength and vigor of his life. He was a very enthusiastic and successful teacher. Though impulsive and ardent, there was in his nature a child-like simplicity and a gentleness of spirit which won the confidence of all who knew him. His death cast a deep and general gloom over the community at Franklin, where he had endeared himself by his unceasing benevolence and where he had long been the light and life of both intellectual and social circles.

MONROE WEED, A. M.—Of the world's workers, so few labor with a pure purpose, a well-directed effort, and a tireless energy, that their decease should not pass without commemorative notice. Such was MONROE WEED, who died at Fisherville, New Hampshire, June 28th, 1867, at fifty years of age. Born near Sackett's Harbor, N. Y., January 18th, 1817, he was the second of thirteen children, of whom but two survive him. The love of truth and the principles of integrity for which among his friends he was distinguished, he always attributed to the early training of Christian parents, and especially to the pious instruction of his devoted mother. His reverence for his parents was not only shown by liberal contributions for their comfort, but one of his last acts was a journey to their residence in Ohio, to arrange for them a pleasant home in their declining years. From early childhood to mature manhood, he struggled with poverty. Such obstacles as few encounter, he overcame in fitting himself, by dearly-bought education, for his life-work. In his own journal he writes: "I have not gained a college degree without many a hard struggle. In my long labor for an education, I was helped but little. Few, save the poor, feel for the poor. I am the stronger, in some respects, for toiling alone." Not quite alone and friendless, though, for he has told us of a good man, in another county, who had in some way heard of his poverty, and who proposed, on certain conditions, to meet, in part, his expenses: to make himself known to this friend, and to acknowledge his kindness, he walked, going and returning, 150 miles, in severe winter weather. He commenced teaching in the district school at an early age, and while his education was yet very limited. Alternating teaching with farm labor, he was finally enabled to commence academic study at Alexander, N. Y. From this period to his graduation from college, much of his time was taken from study and given to outside labor, to supply his scanty resources. In 1838, he became a student at Middlebury Academy, Wyoming, where he remained, with some interruptions, until 1841, when he entered Madison University. After a year at college, he accepted the position of tutor at Middlebury, where he remained more than a year; again returning to his studies with increasing zeal, he graduated in 1846. Not only were his resources eked out by "private classes" in college, but a part of the time he acted as associate teacher in Hamilton Academy, then under the supervision of Prof. Zenas Morse—whom, in 1847, he succeeded as principal, and whose daughter he afterward married. In 1851 he removed to

Le Roy, and in 1852 he took charge of Middlebury Academy, which he conducted with rare success for nearly fifteen years. In the summer of 1866, he accepted the earnest solicitations of the founders of an academy in Fisherville, N. H., to become its head, to which place he removed in October. While the new enterprise prospered under his skillful hand, and its friends felt that, with his direction, a bright future awaited it, he, on whom so many hopes depended, was smitten with fever and passed away to the Christian's home, in the meridian of his usefulness.

Mr. Weed stood in the front rank of his profession. Very few could teach so much in an hour, or a year, as he; and his pupils who entered other and higher schools found that, with his assistance, they had built a foundation broad and compact as truth itself. Mr. Weed's success was the result of a life of the most earnest and untiring devotion to his profession. He gave it no divided attention—no half-measure of affection. If, as has been said, genius is only great patience and thorough painstaking, then he had a genius for teaching. Distinguished less for brilliancy of gifts than for intense application and great tenacity of mind, his culture was in no respect superficial, but wide, and deep, and thorough in whatever he undertook to learn. His methods of teaching and plan of school government were characterized by an earnest spirit, a perfect system, and a practical knowledge of the needs of the young mind, that compelled success. As showing his earnestness and force of character, these are a few of his favorite mottoes: "Not how much, but how well." "If we honor our profession, it will honor us." "The teacher teaches, wherever he is." "Energy is omnipotent; without energy, what is man?" "The teacher is like a candle, which lights others while consuming itself." "God buries his workmen, but the work goes on." Himself a living and devoted Christian, he deemed the character sadly incomplete without piety, and lent his influence, in all proper ways, to recommend and encourage it. In the Sunday school he was an instructor of rare excellence, and for many years a most efficient superintendent. Nor did he allow his profession to shut him out from the cheerful and liberal performance of all his duties as a citizen. Indeed, his time, and pen, and purse, were unfailing aids in every good work.

As an accomplished teacher, zealous Christian, faithful citizen and earnest worker for the right, his loss will be sincerely lamented, and his example will leaven the lives of all who knew him.



REV. WILLIAM COLEGROVE KENYON, A. M., was born in Hopkinton, R. I., October 14, 1812. His early lot was one of poverty and hardship, he having been "bound out" at five years of age, and having no early advantages for education except such schooling as he might get in the winter season, doing "chores" night and morning and working one day in the week for his board. His aspirations were first awakened by one Deacon BABCOCK, who, benignly laying his hand upon the boy's head, assured him that "he could make a man." At the age of nineteen he bought his time and commenced learning the trade of machinist, with which he combined assiduous study in the shop, while working with the lathe and file. In this way he acquired a meagre preparation for Union College, which he entered in 1836. During the period of his nominal connection with the college, he was much engaged in the prosecution of his trade and in teaching. In the spring of 1839, he accepted an invitation to take charge of a school at Alfred, in the midst of a field then comparatively unoccupied by institutions of learning. He continued to prosecute his college studies in connection with his labors in teaching, but never graduated, though the honorary degree of Master of Arts was conferred upon him in 1844, by Union College. In 1843, the school with which he was connected had grown from a few students in a small room to more than two hundred, with three additional buildings and a fund of ten thousand dollars, and received an academic charter from the Regents of the University. During the year 1847-8, four hundred and fifty-five pupils were in attendance. In 1857, the Legislature granted a University charter, and Professor KENYON was elected president. In 1865, he retired for a time from active connection with the institution. After resuming his post, illness compelled him to seek medical aid, rest and foreign travel. He had spent some time abroad and was returning home from the continent of Europe, when his decease occurred at London, June 7, 1867.

In President KENYON's estimation, it was "worthy of a true and noble ambition to build seminaries and colleges and fill them with young men and women who, properly trained, might go forth to exert an influence as lasting as time." He sometimes said that the noblest inscription he could have for his tombstone would be that as a teacher he had been good at drill, and had secured mental concentration, steadiness of mental nerve and eye, and steadfastness of purpose, leading to an appreciation of life's opportunities and

responsibilities. Centering all the energies of his being on the definite end to be accomplished, and working towards it with persevering toil, he succeeded to a degree which few men in his circumstances would have realized. The neglected boy, trained by necessity to self-reliance, was enabled by his indomitable will and untiring energy to work out his great mission as a pioneer teacher and as the founder of a large and prosperous institution of learning. In all hours of misfortune, of doubt and despondency, he had faith that amounted to assurance, and rising from the ashes of frustrated or blighted prospects, and letting "the dead past bury its dead," he used all failures as stepping stones to higher effort and nobler achievement. His was one of the truest and noblest of natures, and his very faults were his virtues intensified, leaping beyond bounds. If he descended like a thunderbolt upon the stupid and the lazy, the frivolous or the rowdy, the earnest seeker after knowledge, the hard worker and the needy found in him the gentleness of the dews of Hermon, the sacrifice and help of a father. To him life was a fiery battle, and his voice ever rung out to the young as the shout of a leader tried and true. Ever riding earnestly, even furiously ahead amid flame and smoke, he had words of cheer for those that would spur up to his side or press hard after, but woe to the laggard or the coward. As the fruit of his tireless energy and perseverance, he left behind him an accumulation of buildings and other property of the University worth some fifty thousand dollars,—an outgrowth of toil and sweat and struggle,—and five thousand young men and women who as pupils came under his influence, and to whom, as to all, his forgetfulness of self, and his many positive excellencies, should serve as an inspiring example.



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